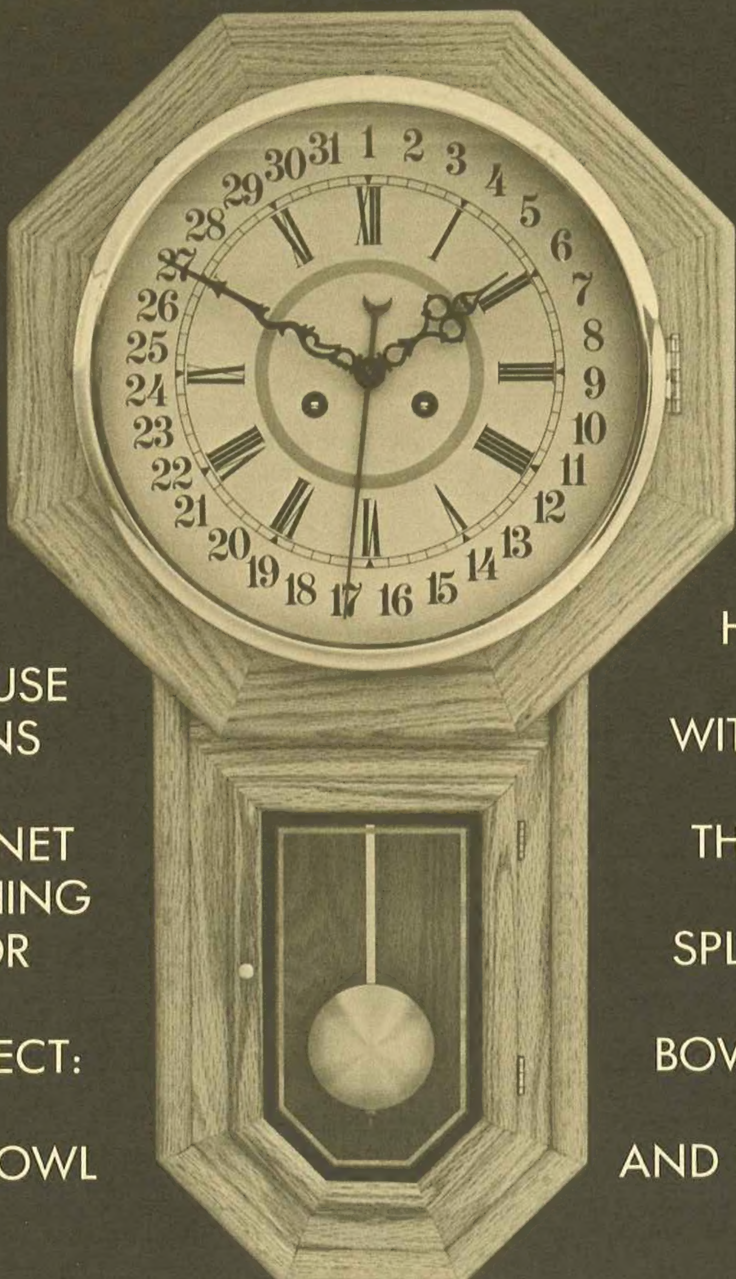
NO. 21 NOTES FROM THE SHOP

Woodsmith®



SOLID OAK SCHOOLHOUSE CLOCK PLANS

CURIO CABINET AND MATCHING WALL MIRROR

LATHE PROJECT: TURNING A WOODEN BOWL

HOW TO CUT CIRCLES WITH A ROUTER

THE BASICS OF MITER AND SPLINE JOINERY

BOWL TURNING: THE TOOLS AND TECHNIQUES

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Woodsmith

Number 21 **May, 1982**

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Sawdust

ABOUT THIS ISSUE. As soon as we finished the Schoolhouse Clock for this issue, we decided to hang it on the wall in our reception area. Since we rent space in a large building, we often get visitors looking in to see what the latest project is. The day we put the Schoolhouse Clock on the wall, we had two requests to buy it on the spot . . . for $350.

Now I was faced with a tough decision. Should I spend the weekend building another clock and pick up an easy $350? Or should I do what I really want to do: mow the lawn and pull weeds in the garden?

TOOLS. A comment I hear from a lot of guys just starting out in woodworking goes something like this: "I'd like to build a project like that Schoolhouse Clock . . . if I only had the tools."

Well, we built the clock, the Curio Cabinet, the Lazy Susan and the Trivet (all shown in this issue) with only two major tools: a table saw and a router. That's certainly not much in the way of tools.

Actually, I'll have to admit that you do need one more tool. Patience. All of these projects involve mitered joints. Although one miter is not all that difficult to cut, when you have to cut several miters (for an octagonal frame, for instance), they all have to mate perfectly. That tends to take a little time. And maybe a few trial cuts on some scrap wood. (Our shop is litered with scraps like this.)

Question: You said you used a router for all of these projects. What kind of router did you use?

We have four routers in the shop (*Sears*, *Rockwell*, *Stanley* and *Makita*). It's not that we needed all of them. It's jûst that we're in the process of trying them out.

But to answer the question, we used a new *Sears Craftsman* 1 hp. router for most of the work. Surprised? I wanted to use this router for two reasons. First, I like to use the kind of equipment that most of our readers are likely to own. And second, I wanted to use the new *Sears* edge guide and trammel-point attachment (No. 25179, $15). It's a pretty nice little gizmo.

Now that we're on the subject of routers, I have a few other comments I'd like to make. I have the feeling that routers are kind of "dream machines" for woodworkers. With all those bits and attachments, you ought to be able to do almost anything with them.

But the process of turning dreams into a finished project is not always an easy one. Consequently, routers spend most of their time collecting dust.

In fact, I've come to think of a router as just a fancy motor that needs some help. And the best help I know of is a router table. Ever since we built the router table (shown in *Woodsmith* No. 20), my router has spent a lot more time making dust . . . instead of collecting it.

Okay, Don, why the big sales pitch on the router table?

As I mentioned above, I have this thing about using tools that our readers are likely to have. Although several brands of router tables are on the market, I really prefer our "home-made" version.

I guess what I'm getting at is this: I like this router table, so I used it to build the projects in this issue. But that sort of implies that you have to build the router table before you can build any of these projects. Which is sort of true. So, I feel a little guilty because you may not want to build it. But I think it's a pretty good tool, so I tend to encourage building it. And I drive myself crazy in the process.

LATHE PROJECTS. Turning to a new subject, we've received a lot of requests for lathe projects. And that presents a problem. I don't have much experience with lathe work, and to be honest, I don't get that excited about it.

However, Steve (our new Assistant Editor) is pretty good on a lathe, so he's the one that got us going on the Turned Fruit Bowl in this issue. In fact, he's now working on a series of articles on turning.

Why did we choose a bowl (faceplate turning) to start this series?

Well, we didn't know where to start, so we sat down and talked about it. Steve said that almost every book he's seen on turning suggests that you should start out with spindle turning (between centers) to learn the basics.

I said, "Yeah, but spindle turning usually means turning legs, and then I have to build a table to go with the legs."

Steve responded, "Well, we could turn a simple bowl, but it takes a little more patience to learn the techniques."

My eyes lit up, "Patience, there's my favorite word. Let's do it."

The next day, Steve emerged from the shop with a prototype of the bowl he had in mind, and handed it to me. Now, usually when I see a woodworking project, I stand back, cross my arms, and stroke my chin with a serious look on my face.

This time things were different. As I held the bowl, I could see the wood, but I could also feel it. And I could feel the texture and the shape of it.

That's all it took. Now I'm excited about bowl turning, and I think we'll be doing a lot more of it.

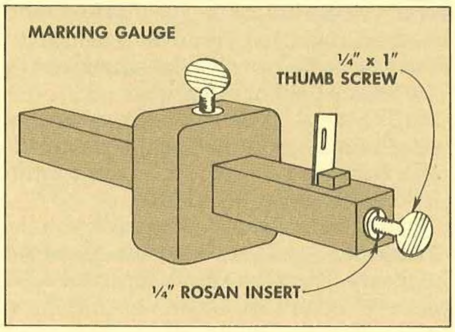
NEXT MAILING. July, 1982

Tips & Techniques

IMPROVED MARKING GAUGE

In the January issue of *Woodsmith*, I found an item that I was very interested in: the marking gauge. Your design makes a beautiful tool and it struck a responsive chord when I noted that you used a rosan insert to make the clamping mechanism of the gauge block. But I was surprised that you did not use a similar device for holding the knife blade, instead of making do with a wedge.

Here's my idea: start by drilling the very end of the arm for a ¼" rosan insert. Be sure that there's enough room between the square mortise and the end of the arm for



the entire length of the rosan insert. Then insert the rosan insert and a ¼" thumbscrew to secure the wedge.

This gives you a mechanism which will make blade adjusting much more accurate and a lot easier.

Edwin Tichenor
Pelahatchie, Mississippi

Rosan inserts can be purchased from: The Woodworkers' Store, *21801 Industrial Blvd., Rogers, MN 55374, (612) 428-3200. They're available in two sizes, ¼" and 5/16", call for current prices.*

SENSIBLE STOP LINES

Whenever I'm cutting blind dado's with a router table or table saw, I always make a line on the table so I know just how far to run the stock. With just one line I was always wondering when it would show up. I sometimes let the cutter burn the stock in anticipation, and sometimes I cut too far before I saw the line.

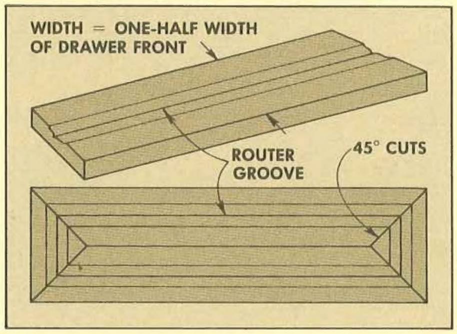
Now I make four parallel lines in front of my stop line, with equal spacing between each line. The lines are visible before reaching the stop line, and with the equal spacing, almost allow you to "see" the stop line before actually reaching it.

Ronald T. Mowry
Janesville, Wisconsin

INEXPENSIVE DRAWER DESIGN

I wanted to make a drawer front with a router design, without having to use a lot of expensive woodworking equipment. The problem I kept having was how to achieve a good 90-degree corner.

To solve the problem, I ripped a board to equal ½ the width of the drawer front, and



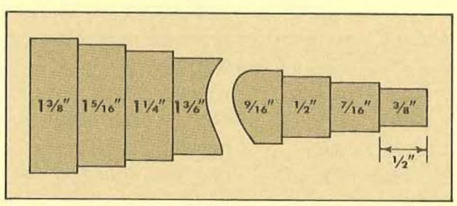
about 2½ times as long as the actual drawer. Then I routed a groove, using the router table and a *Sears* center-point ogee bit, the entire length of the board.

After it was routed, I mitered (45°) the drawer front as shown, and glued the pieces together. The results were excellent, and it was a lot easier to do than I expected. By carefully selecting the wood, it's possible to achieve perfect 90° turns in the wood grain.

Alexander L. Smith
Virginia Beach, Virginia

TURNING GAUGE

I've tried to set outside calipers with a ruler when measuring spindle turnings, and to be honest, it's not really a very accurate method.



Instead, I turned a gauge with steps for different measurements. Each step increases in 1/16" increments, ranging from ⅜" to 1⅜" (the sizes I frequently use).

It's very easy to set your calipers to the correct size, using the gauge. You also get the same "feel" of the calipers slipping over the gauge as you do when they slip over the piece being turned. This helps insure that the size is correct.

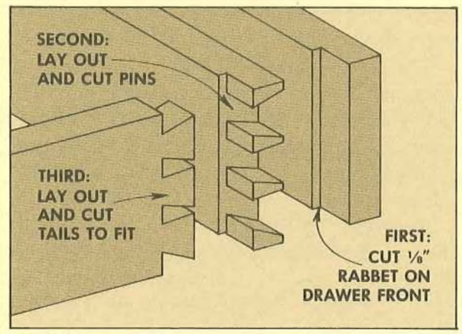
L. A. D. Colvin
Satellite Beach, Florida

RABBETED DOVETAILS

After reading your January issue on dovetails, I thought you might be able to use this shop tip on cutting a rabbeted dovetail.

I cut a rabbet on the inside of one board before cutting either the tails or the pins. This rabbet can be any depth (I usually cut mine ⅛" deep), but the width must exactly match the thickness of the other piece. The primary purpose of the rabbet is to provide a shoulder to conceal the inside seam of the dovetail, and to give a sharp appearing line down the inside corner.

Besides concealing any roughness in the



corner of the joint (in the same manner as the shoulder of a tennon covers the mortise), the rabbet also makes chopping the dovetail easier. First, the wood is thinner, so there's less waste to cut. Second, the shoulder of the rabbet can be used as a stop for the chisel, making the clamping of an auxiliary board unnecessary on the inside of the drawer front.

John Wilson
Charlotte, Michigan

This is also a good technique for concealing the groove for a drawer bottom when using a through dovetail.

SEND IN YOUR IDEAS

We invite you to share your woodworking tips and techniques with other readers of *Woodsmith*. We will pay a minimum of $5 for a tip, and $10 or more for a special technique. All material submitted becomes the property of Woodsmith Publishing Co. Upon payment, you give *Woodsmith* the right to use the material in any manner for as long as we wish.

If your idea involves a drawing or photo to explain it, do your best and, if necessary, we'll make a new drawing, or build the project or jig and photograph it. (Any drawings or photos submitted cannot be returned.)

Send your ideas to: *Woodsmith*, Tips & Techniques, 2200 Grand Ave., Des Moines, Iowa 50312.

Schoolhouse Clock

THE OLD CLOCK ON THE WALL SAYS IT'S TIME

This Schoolhouse Clock is built from just two oak boards 6-feet long. That's not what I would call a lot of lumber. However, these boards must be cut up into 32 small pieces (just the right size and shape), and carefully joined together.

I think that's the most intriguing thing about clock-building. It doesn't require a lot of wood . . . but it does require a lot of woodworking skill.

JOINERY. Joinery is probably the most important aspect of this clock. Almost every joint is on display, so it must be cut accurately. However, that's not easy because the pieces are somewhat small, and most of them are mitered at 22½°.

This miter angle is the result of the octagonal (eight-sided) design theme. The frame surrounding the dial, the part of the case extending below this frame, and the frame for the glass door all require miters cut at 22½°.

Since each of these miters is joined with the aid of a spline, grooves must be cut in all mitered pieces. Although this can be done on a table or radial-arm saw, I found it was a whole lot easier on a router table. I guess what I'm getting at here is that you might want to build the router table (shown in *Woodsmith* No. 20) before launching into this Schoolhouse Clock.

There is one other consideration. The woodworking part of this project is both fun and challenging. However, the result is *not* a clock. Rather, it's just the case for the real "guts" of the clock: the works.

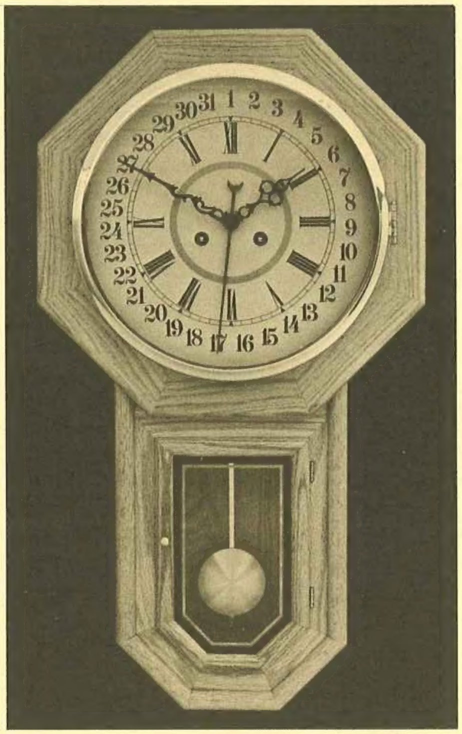
THE CLOCK MOVEMENT

We designed this schoolhouse clock to accept two kinds of works: either the traditional "gear and spring" movement, or the modern replacement: a battery-operated quartz movement.

For the clock shown here, we went all out and bought a German-made, solid brass movement. from *Mason & Sullivan* (a division of *Woodcraft*) 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102-1686, (800) 225-1153. The movement is listed as a Calendar 'Bim-Bam' Key Wind Pendulum Movement.

All of that means it's a 14-day, spring-driven movement that drives both the minute and hour hands, as well as a calendar hand. This movement also comes with a two-tone (Bim-Bam) chime, a brass pendulum rod and bob, and black serpentine hands. The *Mason & Sullivan* catalog No. is 3341X (14½" pendulum). Call *Mason & Sullivan* for current prices.

If your budget doesn't allow for that



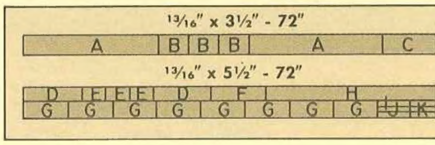
kind of expense, you can also use a battery-operated quartz movement. The movement that we know will fit this clock is from the *Klockit Company*, P.O. Box 636, Lake Geneva, WI 53147, (800) 556-2548. The quartz movement is catalog No. 12005, call for more information.

This movement has provisions for hour and minute hands (but not a calendar hand), Bim-Bam chimes (that sound something like an electric door bell), an integrated pendulum movement, and a tick-tock sound. (Note: The pendulum length is measured differently on this movement — you need a 16" pendulum instead of 14½".)

MATERIALS LIST

A Case Sides	13/16 x 3¼ x 21⅜ (23)
B Case Bottoms	13/16 x 3¼ x 3¾ (4½)
C Case Top	13/16 x 3¼ - 8½ (9)
D Frame Sides	½ x 1⅛ - 8⅞ (10)
E Frame Bottoms	½ x 1⅛ - 3 5/16 (5)
F Frame Top	½ x 2 - 8 (10)
G Dial Frame	13/16 x 3 - 6 3/16 (7½)
H Molding Strips	13/16 x ⅜ - cut to fit
I Door Top	13/16 x ⅞ - 6 (8½)
J Door Sides	13/16 x ⅞ - 7 7/16 (8½)
K Door Bottoms	13/16 x ⅞ - 2½ (3½)

CUTTING DIAGRAM



DIAL, BEZEL, ETC. In addition to the clock works, there are a few other things you'll need:

1) The Dial. We ordered an 11¾"- diameter enameled metal dial with a 31-day date ring from *Mason & Sullivan* (Catalog Product No. 7406S). Note: when ordering please specify "key-hole punched for the 3341X movement".

If you choose the *Klockit* quartz movement, you can still order the dial from *Mason & Sullivan*, but there's no need for the date ring or the punched key holes, so any 11¾"-diameter dial will work.

2) The bezel. This is the glass door and brass frame that fits over (and protects) the clock face. Again we used a *Mason & Sullivan* bezel: Catalog No. 4200B.

3) Hinges and knobs. In addition to the clock works, you'll need some miscellaneous hardware. We were able to purchase all of these items at a local hardware store. However, we're also listing the catalog number from *The Woodworkers' Store*, 21801 Industrial Blvd., Rogers, MN 55374, (612) 428-3200.

Brass Butt Hinges, ¾", two pair. (Product No. 27573)
Brass Door Knob. (Product No. 27755)
Bullet Catch, 5/16" diameter, ⅜" long. (No. 28472, per 10)
Turn-Button Latch. (No. 27912, per 10)
Brass Hanger. (No. 27565, per 10)

4) Glass for Pendulum Door. We used single-strength window glass for the pendulum door, and cut it to fit the door frame ourselves.

Note: Since this was first printed, *Mason & Sullivan* has gone out of business. You can special order the Hermle keywind movement through Black Forest at (800) 824-0800, and the dial/bezel from Murray Clock Craft Ltd. at (416) 499-4531. Or use a quartz movement. I suggest you locate these *before* you begin.

THE CASE

The case (shown in Fig. 1) has six sides, with the bottom three pieces forming a partial octagon. To keep a continuous grain pattern from one piece to the next, I cut all six pieces from one board (as shown in the Cutting Diagram).

First I cut each piece to rough length (see Materials List), marking them to keep them in order. Then I ripped all pieces to

3¼″ final width.

CUT TO LENGTH. Five of these pieces (the two sides and three bottom pieces) can be cut to final length now. (The top is cut later). I started with the two side pieces (A), cutting the top end square. The bottom end is cut at a 22½° miter so the final length (from the square end to the long point of the mitered end) is 21⅜″.

Next, the three bottom pieces (B) are cut. These pieces are mitered at 22½° on both ends so the final length (from long point to long point) is 3¾″.

GROOVE FOR SPLINES. Now the grooves for the splines can be cut. As shown in the detail in Fig. 3, the groove is positioned 5⁄16″ from the long point of the miter to allow room for the rabbets. Once the grooves are cut, the splines are cut to fit. (This technique is discussed in more detail on page 8.)

RABBETS. Finally, rabbets must be cut on both the front edge and back edge of the two sides (A) and the three bottom pieces (B) — the top is not rabbeted. The ¼″ x ½″ rabbet on the front edge is for the door frame, and the ¼″ x ¼″ rabbet on the back edge is for the plywood back, Fig. 3. Also, a ¼″-deep rabbet on the top ends of the two side pieces (A) should be cut 13⁄16″ wide (to match the thickness of the top piece), see Fig. 2.

THE TOP PIECE. Dry-assemble these five pieces (minus the top) to make sure everything fits properly. Now final measurements for the top (C) can be taken.

The top piece is joined to the two sides with a rabbet and dado joint, see Fig. 2. Cut a ¼″-deep dado right along the shoulder of the rabbet. Then cut a rabbet on both ends of the top piece (C), leaving a tongue to fit in the groove. The key thing here is that when the top is installed, the two sides (A) must be parallel. If this forces the mitered joints on the three bottom pieces slightly out of alignment, it's not too much of a problem because they'll be covered with a molding strip later.

ASSEMBLY. All six pieces for the case can now be glued together. I started with the bottom pieces and worked my way around to the top. I used two band (strap) clamps around the perimeter of the case to hold it together while the glue was drying.

THE DOOR FRAME

As the glue was drying on the case, I started work on the door frame — the six pieces between the case and the glass door. Since one of these six pieces is 2″ wide, first I ripped a 2″-wide strip, 45″ long.

Before cutting the six pieces to rough length, I resawed (ripped on edge) this strip to a ½″ thickness. Then I cut off a 10″ length for the top piece (F), and ripped the remainder 1⅛″ wide for the two sides (D) and three bottom pieces (E).

Now, each of these five pieces is cut to rough length using in the sequence shown in the Cutting Diagram to maintain a continous grain pattern. Next, both ends of each piece are mitered.

I started with the center bottom piece (E), mitering both ends at 22½°. Then I glued it in place. Next, I cut the two other bottom pieces and glued them in place, Fig. 4. Getting these pieces to fit takes a little playing around. Although they should be mitered at exactly 22½°, in reality they're cut to fit so the joint lines are tight and match up with the joint lines on the case.

For the side pieces (D) one end is mitered (at about 22½°) to mate with the bottom pieces. But the other end (the top end) is mitered at 45°. The final length of both side pieces should be 8⅞″ from long point to long point.

Before gluing the side pieces in place, I cut two notches in one piece for the door hinges. These notches are ¾″ wide (or the width of the hinges) and ¼″ deep. On the other side piece a 5⁄16″ hole is drilled for a bullet catch.

Finally, the 2″-wide frame top (F) is cut to fit between the rabbets in the case, and mitered (at 45°) to mate with the side pieces, Fig. 5.

FIGURE 1

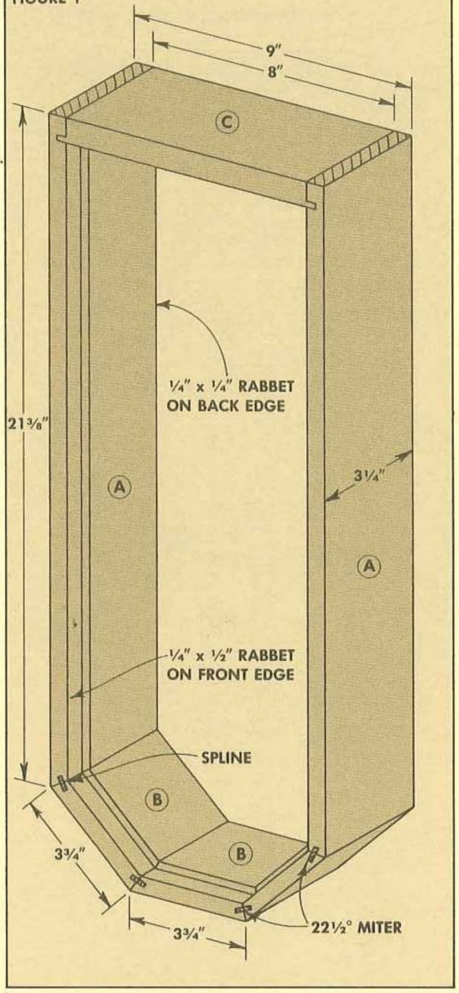


FIGURE 2

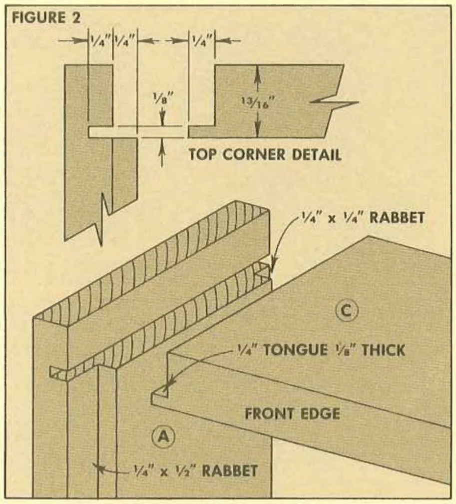


FIGURE 3

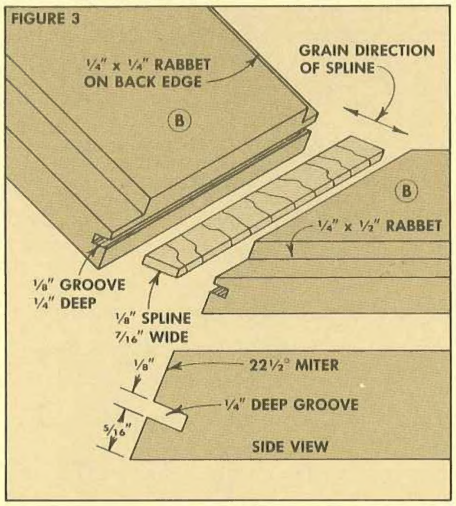


FIGURE 4

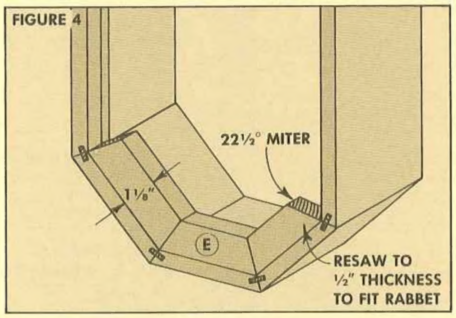


FIGURE 5

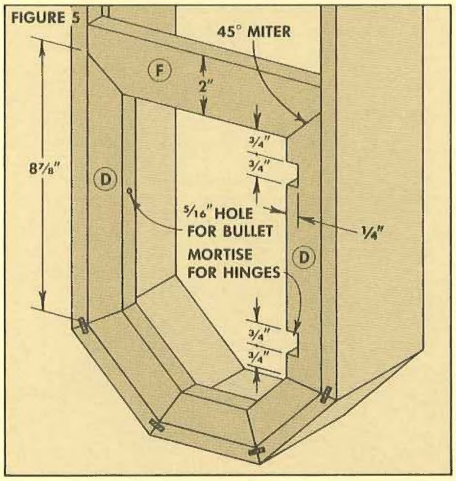


FIGURE 6

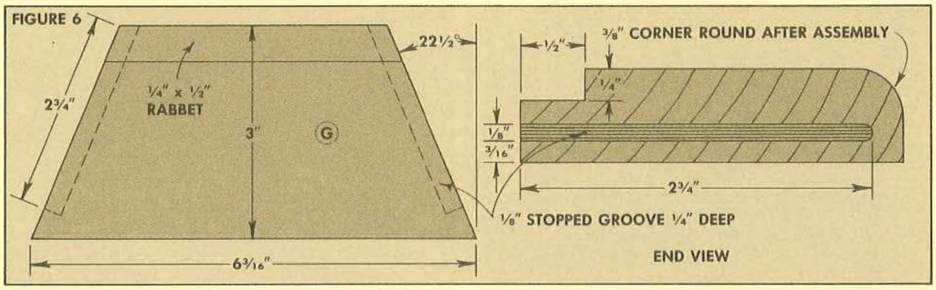


FIGURE 7

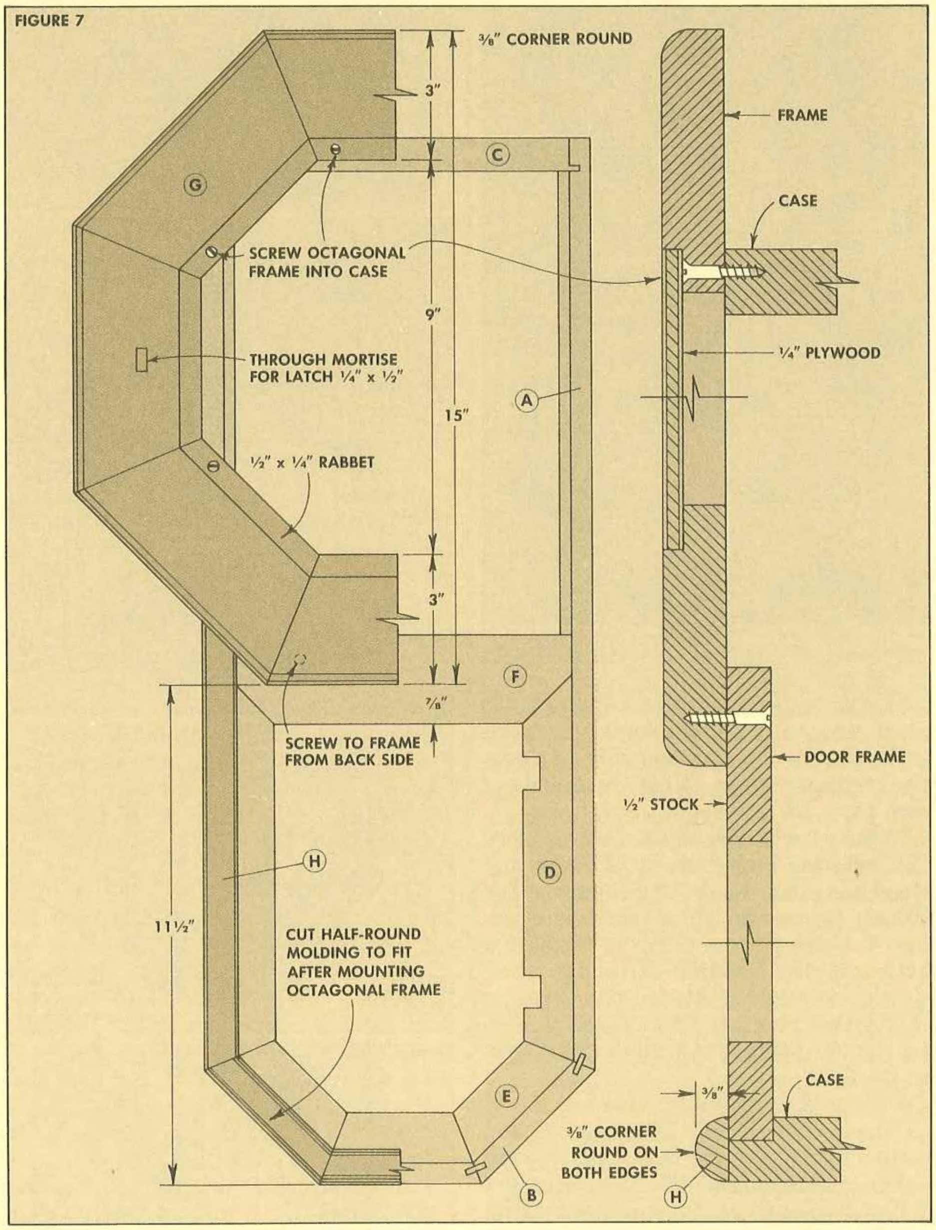


FIGURE 8

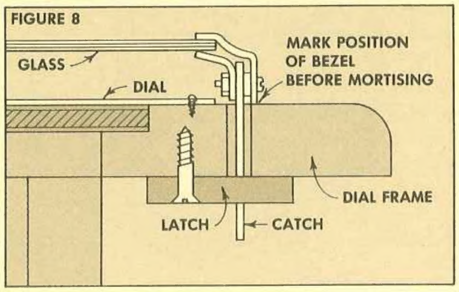
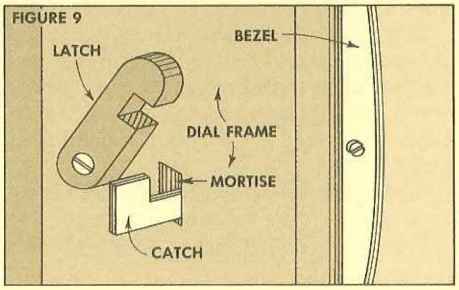


FIGURE 9



THE OCTAGONAL FRAME

As with all the other pieces so far, the octagonal frame (surrounding the dial) is cut from one strip of wood to get a continuous grain pattern.

Rip a piece of stock 3" wide by 60" long (see Cutting Diagram) for the frame pieces (G). Then cut each piece to rough length (7½"). Both ends of each piece are mitered at 22½° so the final length is 6³⁄₁₆" from long point to long point.

This is not easy. In fact, the best approach is to make trial cuts on some scrap wood. Then fit the eight trial pieces together. If there's more than an ⅛" gap (total) on this assembly, reset the miter gauge and try again. The pieces don't have to fit perfectly (some correction can be made during assembly), but they should be close.

GROOVES FOR SPLINES. Now the grooves for the splines can be cut. These grooves must be stopped so they don't show on the perimeter of the frame. (This where the router table works like a charm, see page 8 for details on this cut.) These spline grooves should be cut close to the *back* side of each piece to allow room for the rabbet on the front edge, see Fig. 6.

After the spline grooves are cut, a ¼" deep by ½" wide rabbet is cut on the front (face) side of each piece. (Again, this was done on the router table.)

ASSEMBLY. Gluing-up this frame is done in stages. First, I glued pairs together to form four sections. Then I glued two sections together to form two halves. If the splines fit tightly in the grooves, this gluing can be done without clamps. Just apply some glue to the miters and the splines, and push them together.

To complete the frame, I cleaned up the mating edges of the two halves with the jig shown on page 17, and glued them together. Finally, I rounded over the outside edges with a ⅜" corner-round bit.

PLYWOOD INSERT. The clock movement is actually mounted to a plywood insert that's cut to fit inside the octagonal frame. If you're using the 3341X movement (from *Mason & Sullivan*), you must also cut a 4⅜"-diameter hole in the plywood insert.

MOUNT THE FRAME. Now the octagonal frame can be mounted to the case with 1" flat-head screws. To get a good fit over the door frame, I also screwed the octagonal frame to the door frame (going in from the back), see Fig. 7.

MOLDING STRIPS. Once the frame is in place, molding strips (H) are added to the bottom half of the case. To make these half-round strips, I rounded both edges of a piece of waste with a ⅜" corner-round bit. Then I ripped off a ⅜"-thick strip to get the half-round molding.

MOUNTING THE DIAL AND BEZEL. There's a little hand-work involved in mounting

the bezel: two mortises must be cut.

One mortise is the size and depth of the hinge on the brass frame of the bezel. The second mortise — for the catch — must go all the way through the frame, see Fig. 8. I centered the bezel on the frame and marked the position of these mortises. Then I cut them out with a chisel.

The last step is to make a little wooden latch to hold the bezel catch, Fig. 9. This is just cut from a piece of scrap and mounted with a ¾" flat-head screw.

THE PENDULUM DOOR

The glass door that fits over the pendulum is probably the most difficult part of this project. The pieces are small to begin with, but then there's a rabbet cut on each side to make them even smaller.

To make this door, I ripped several small strips ⅞" x 1³⁄₁₆", see Detail A in Fig. 10. One edge of each strip is rounded over, and then a ¼" x ½" deep rabbet is cut below the rounded-over edge. (This rabbet will be the inside edge of the door.)

Now you have to cut pieces from these strips to fit the door frame. This takes a little measuring, and a lot of luck. Here's how I went about it.

I knew I wanted the door to over-lap the frame by ⅛". (The rabbet on the outside of the door is ¼" wide, but the overlap is only ⅛" because I wanted to leave ⅛" for clearance.) Going back to the case, I marked a line ⅛" from the inside edge of the door frame. Wherever the marked line crossed a joint line, that was the length of each piece for the door.

Once the pieces have been cut to length, grooves are routed for the splines, and splines are cut to fit the grooves. For assembly, this door is small enough to allow hand-pressure gluing at all joints.

After the glue is dry, the outside edges are rounded over — again with a ⅜" corner-round bit on the router table, see Fig. 11. Then a ¼" x ½" rabbet is cut on the outside edge using a straight bit and the fence on the router table, Fig. 12.

To finish the door, glass is cut to shape, and then ¼" x ¼" stops are cut and glued into the rabbets to hold the glass in place.

To mount the door to the frame, first cut two small filler blocks and glue them to the door directly across from the notches in the frame, Fig. 13. Then the hinges can be screwed in place.

THE BACK. As shown in Fig. 14, the plywood back for the clock case is cut in half. The bottom half is tacked in place. But the top half is hinged to the case so it can be opened to get to the movement. Since this back can be seen through the glass door, I used ¼" oak plywood.

MOUNTING THE MOVEMENT. The 3341X movement has four mounting brackets so it can be screwed to the plywood insert in the octagonal frame. The chimes also have their own mounting bracket that's screwed to the top of the case.

FINISHING. I used *Watco Danish Oil* to finish this clock case. The nice thing about this oil is that it can be used to fill any gaps between all of those mitered joints. Apply a liberal amount of oil and sand with 220-grit silicon carbide paper. This creates a "goop" that fills the gaps (and the pores in the oak). When the gaps are filled, wipe off the excess "goop," let it dry (24 hours), and add another coat of oil.

FIGURE 10

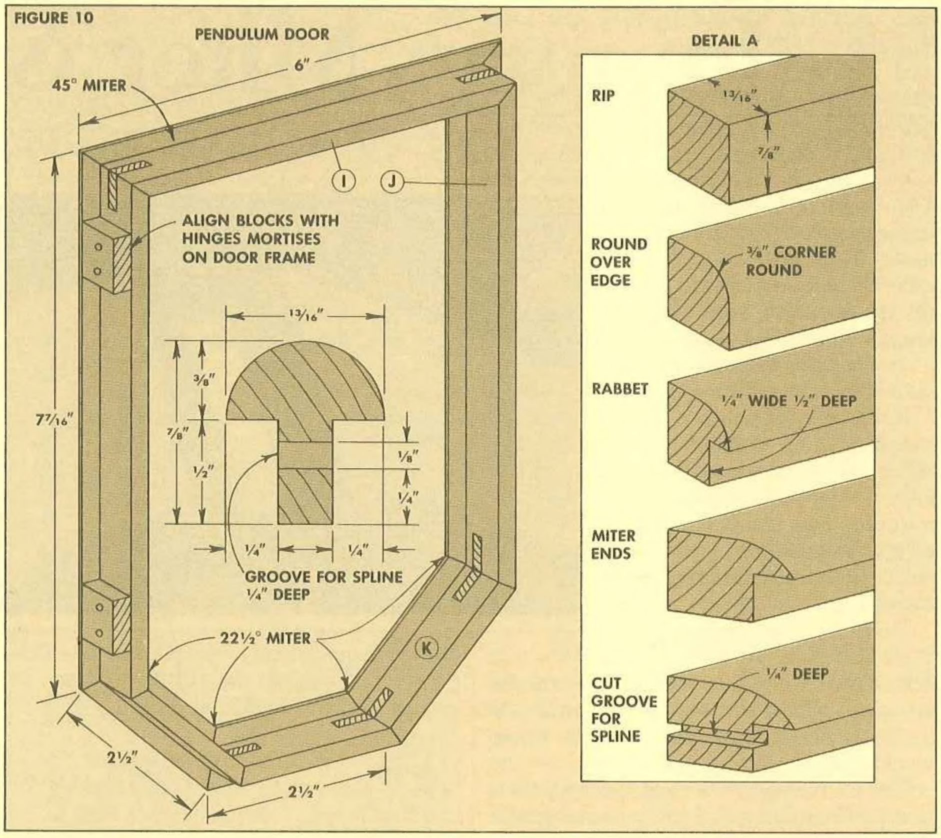


FIGURE 11

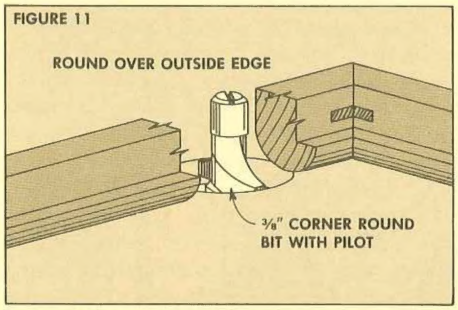


FIGURE 12

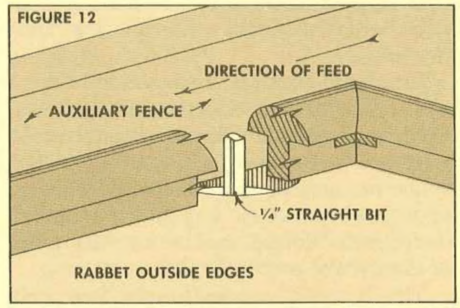


FIGURE 13

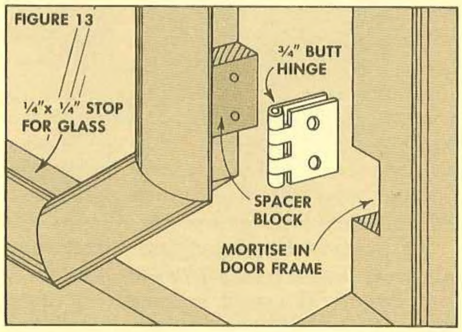
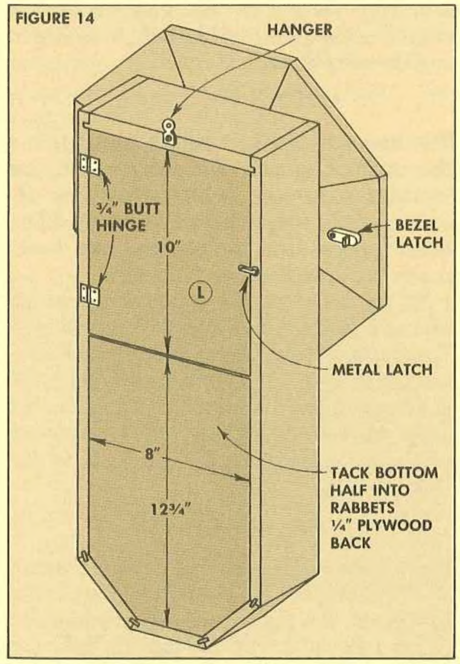
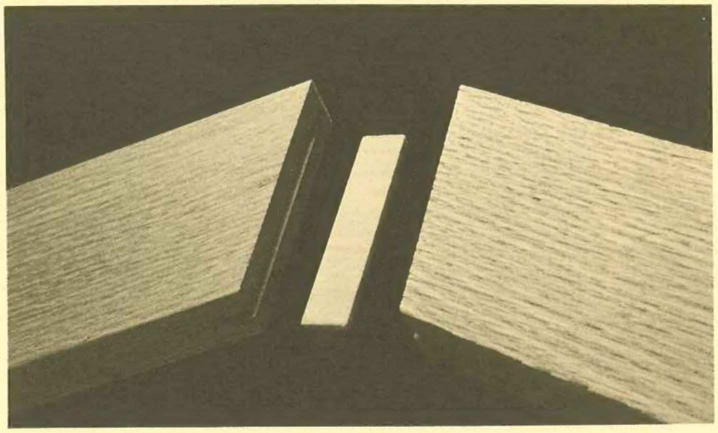


FIGURE 14



Joinery: Miter & Spline

A MITER WITH A SECRET PARTNER



We used miter and spline joinery on every project in this issue. That alone should indicate it's quite a versatile joint. Miters can solve a lot of problems — especially on any type of frame that requires special cuts along the edge.

For instance, you can make molding cuts or rabbets — either on the inside or outside edge — *before* the pieces are mitered. This eliminates many of the headaches associated with other frame joints (like a mortise and tenon).

However, miters do have their bad side. In fact, cross miters (cut across the face of a board) and end miters (a bevel cut at the end of a board) are probably the two worst joints in woodworking.

The problem with both of these joints is that you're joining end-grain to end-grain. And no glue (no matter how strong it is) will hold this kind of joint together (for long).

However, there is a simple solution: a spline. If a groove is cut in both mitered pieces, a spline can be inserted to strengthen the joint considerably. The spline not only adds mechanical strength, but it also provides a good glue surface (long grain to long grain) between the sides of the groove and the spline.

Yet, this solution creates another problem: How do you cut the grooves for the splines . . . accurately? In fact, how do you cut the miters accurately?

SETTING THE ANGLE

The first step for cutting a miter is to set the angle of the cut. The accuracy of your setting, however, is limited by the accuracy of the markings on your saw. Most miter gauges and radial-arm saws leave much to be desired.

To get an accurate setting I use an adjustable protractor. (See Talking Shop in *Woodsmith* No. 20.) This type of protractor can easily be adjusted to fractions of a degree, and is well worth having in the shop. Adjustable protractors can be found at almost any art supply store, or in the *Garrett Wade* Catalog.

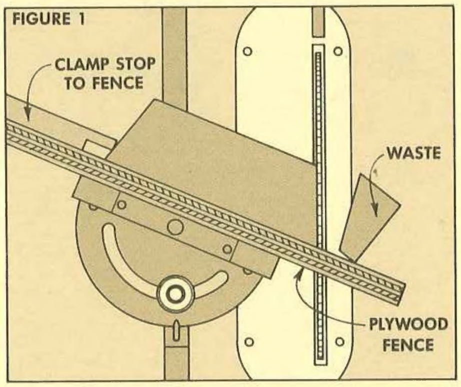
MAKING THE CUT

Even if the angle is accurate, the miter cut itself can still be off. The culprit here is the saw blade. It's the nature of a saw blade to either pull the workpiece into the blade as the cut is being made, or push it away. This "creeping" throws the cut out of line. To get around this problem, I use the following procedure.

First, I cut all the workpieces to rough length — about 1″ longer than needed for the final length. Then I set the miter gauge to the proper angle.

FENCE AND STOP. When working on a table saw, I attach a plywood fence to the miter gauge. The fence supports the workpiece all the way to the blade, and also pushes the waste out of the way.

FIGURE 1



To prevent the "creeping" mentioned above, I fasten a stop block to the fence, see Fig. 1. The stop is helpful in three ways. If the saw blade tends to push the workpiece away, the stop prevents it. If the blade tends to pull the workpiece, you can counteract this action by pushing the workpiece toward the stop. Also, the stop is very handy for cutting several pieces to the same length.

MAKING THE CUT. I like to sneak up on mitered cuts — making two cuts on each mitered end. Although this two-cut procedure is rather time-consuming, the result is an accurate miter.

As mentioned above, all of the workpieces have been cut to rough length. Then the first cut for the miter is made. This cut clears away most of the waste on only one end of each piece. I use the stop to make this cut so all pieces are cut to the same length.

The second cut is a trimming operation. I move the stop about 1/16″ closer to the blade, and trim off the very end of each piece. Since only one side of the blade is in contact with the wood, it has less tendency to pull or push, and the cut is cleaner and more accurate.

Next, I mark the final length on the other end of each piece, and repeat the two-cut procedure. This time, both cuts can be lined up by using the kerf in the fence as a guide.

SPLINE GROOVE: CONSIDERATIONS

Now that the miters are cut, a groove must be cut for the splines that join the pieces together. These grooves can be cut on either a table saw or radial arm saw. However, it's difficult to cut a stopped groove — especially in narrow pieces.

There is another way. Ever since we built the router table (shown in *Woodsmith* No. 20), I've come to rely on it as an easy and accurate way to cut spline grooves — especially if the groove must be stopped.

After experimenting with this type of operation a little, I found three helpful additions to the router table.

SECONDARY TOP. The router table's top is designed with a 1½″-diameter opening for the router bit. I made a secondary top by drilling a ¼″ hole in a piece of scrap *Masonite*. This top is temporarily clamped to the old top to provide a smooth surface on all sides of the bit (which is necessary when working with very small workpieces).

CARBIDE BITS. Since we usually work with hardwoods, I dug deep in my pocket and bought a ⅛″ carbide-tipped straight router bit. Although this bit is expensive, it's excellent for cutting spline grooves.

AUXILIARY FENCE. When cutting a spline groove in a cross miter, it's very helpful to clamp a higher fence to the adjustable fence on the router table. I just use a 4″ strip of ¾″ plywood, see Fig. 2.

For an end miter, you'll need a fence that's beveled at the same angle as the miter. Here I simply bevel-rip the edge of a 2x4, see Fig. 4.

ROUTING A SPLINE GROOVE

Before cutting a spline groove, mark the face side of all pieces with an "X". If the "X" side is always placed against the fence, you'll be sure the grooves on both pieces line up properly.

THROUGH GROOVES. Cutting a through groove (from one edge to the other) is relatively easy on both types of miters. Simply place the "X" side of each workpiece against the fence, and make the cut.

The workpiece should always move from right to left. With this direction of feed the rotation of the router bit forces the workpiece against the fence.

STOPPED GROOVES. The first step for cutting a stopped groove is to mark where you want the groove to stop on the mitered end. Then measure the distance from this mark to the pointed end of the miter.

This second measurement is used to mark start and stop lines on the router table — one to the left, and one to the right of the router bit, see Figs. 2 and 3.

The actual cutting of a stopped groove presents a problem. Since the "X" side must always be against the fence, the right and left ends of the workpiece are cut in slightly different ways.

Yeah, but which is the right end and which is the left end?

If you hold the mitered piece so the long points are on top, the right end is the right end, and the left end is the left end. (This is the only way I could figure out how to explain what follows.)

CROSS MITER. To cut a stopped groove on a cross-mitered piece, I make the first cut on the right end of the workpiece, stopping at the "stop" line, as shown in Fig. 2.

To make the cut on the left end, I position the pointed end of the miter directly over the "start" line. Then I slowly plunge the workpiece onto the bit, and finish the cut moving to the left, see Fig. 3.

END MITER. For an end miter, both cuts are made the same way as the cross miter, except a beveled fence must be used. For the right end, just feed the workpiece from right to left, stopping at the "stop" line.

But for the other end (the left end), the workpiece must be plunged. Hold the workpiece firmly against the beveled edge of the fence with the left edge lined up with the "start" line. Then slowly push the mitered surface onto the bit. The bit will make a sliding cut until the miter is resting flat on the router table, but it's usually not a problem if you're using a 1/8" bit.

CUTTING THE SPLINES

Now all you have to do is cut the splines to fit the grooves. For greatest strength, the splines should be cut so the grain is going across the joint line. Cutting this type of spline is very similar to cutting a rabbet on the end of a board — except in this case, the waste is the part you want.

This is usually a precarious operation because the tiny waste piece (which is the spline you want to keep), usually gets caught by the blade and is hurled across the room, never to be seen again.

After fighting with this aggravation, Ted (our Design Director) came up with a procedure to solve this problem.

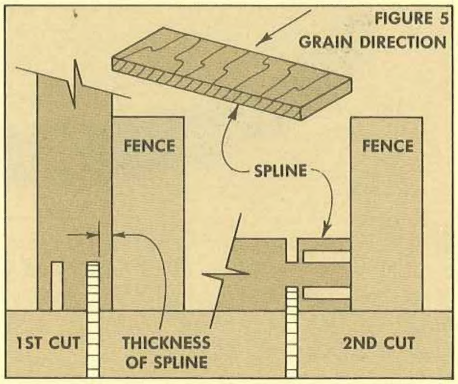


FIGURE 5

CUTTING THE SPLINE. To cut a solid-wood spline, the first cut is made by setting the rip fence the "proper distance" from the inside of the blade. This distance should equal the width of the groove.

What you're trying to achieve is a spline that fits the groove with a good friction fit — not so tight that it has to be hammered in, and not so loose that it rattles around.

The depth of cut (height of the blade) is also important. Measure the combined depths of the two spline grooves. The spline should be slightly less than this measurement so it doesn't prevent the mitered ends fitting together.

If you're working with a stopped groove, raise the blade about 1/8" *less* than this combined measurement. For a through groove, raise the blade about 1/16" less than the combined measurement. Now, stand the board on end and make one cut on one side of the board, and another cut on the other side, see Fig. 5.

SECOND CUT. To make the second cut, guide the workpiece with the miter gauge and use the rip fence as a stop. This is normally considered an unsafe practice, because the small waste piece can easily bind between the blade and the rip fence, and then is thrown back at you.

However, if the rip fence is adjusted so the cut is made just a tad (about 1/32") beyond the end of the first cut, the waste piece (the spline) remains attached to the main body of the workpiece, and doesn't come flying off.

After the second cut is made it's simply a matter of snapping off the spline and cleaning off the ragged corner.

GLUING UP MITERED PIECES

After the miters, the spline grooves, and the splines are cut, you're ready to join the pieces together. But what if all this effort fails to produce clean, tight joints?

Before rushing for the glue bottle, the best procedure is to dry-assemble everything (without inserting the splines). You may have to make a few little trim cuts to get good joint lines.

Once you're sure all joints fit properly, brush some glue on the mitered ends and in the spline grooves. Then apply a very thin coat to the spline. Now just push the joint together with hand pressure.

Wait a minute . . . you mean you don't clamp the pieces together?

Clamping mitered pieces is difficult at best, and usually causes more problems than it solves. Besides, the strength of a miter-and-spline joint is *not* where the two mitered ends meet. Rather, it's the spline, glued into the grooves on each miter, that supplies all the strength.

The spline should fit in the grooves with a good friction fit. Then, as glue is applied, the spline will pick up moisture and swell, making the joint very tight. In fact, after about 30 seconds it's almost impossible to get the joint apart, even if you wanted to.

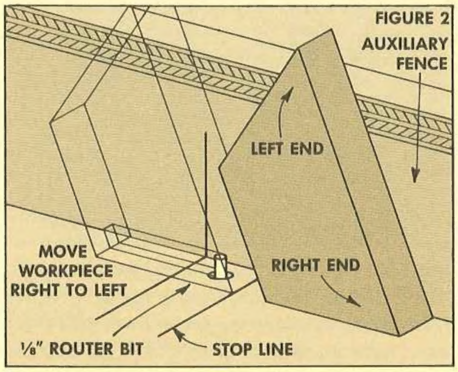


FIGURE 2

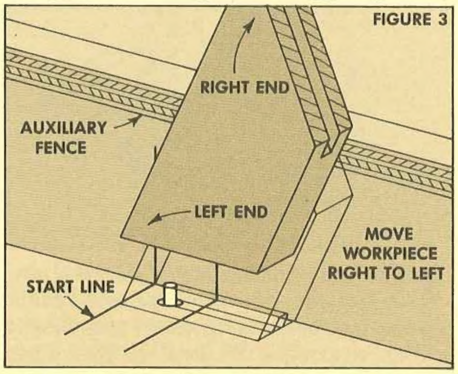


FIGURE 3

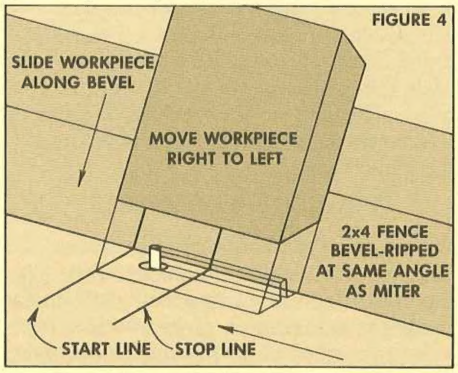


FIGURE 4

Spinning Server

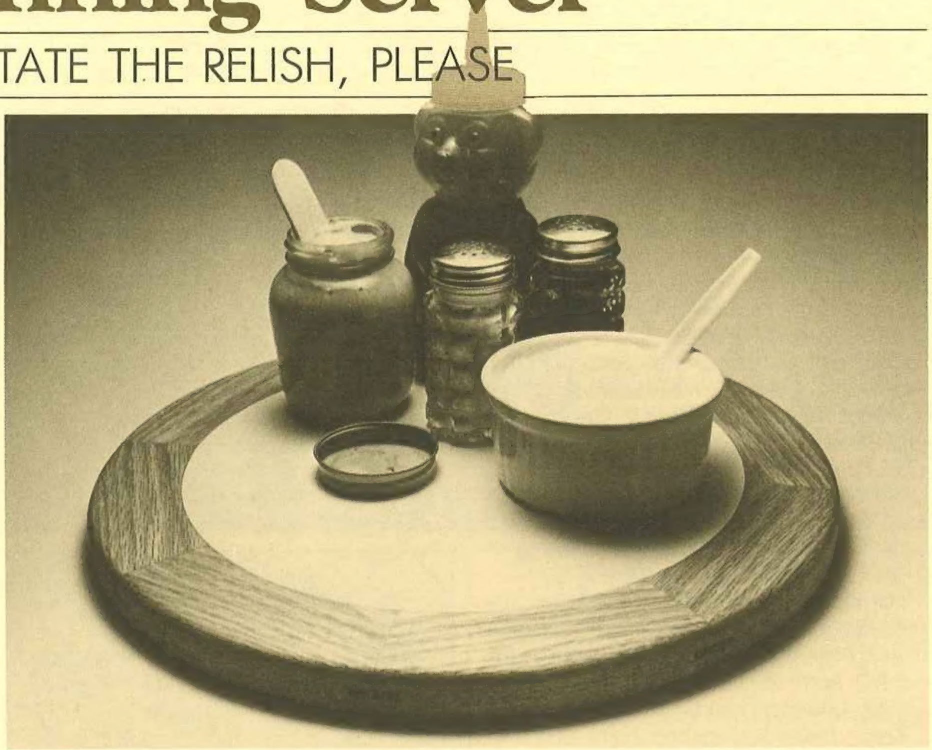
ROTATE THE RELISH, PLEASE

This little Lazy Susan should knock some of the dust off your router and put it to good use. I used a router for two different operations on this project: first, to cut the exposed spline joints for the frame, and then to cut the frame into a circle.

However, I have to admit that the router needs a little help in order to get this project under way.

To cut the grooves for the splines (that join the eight pieces for the frame together), I used the router table shown in *Woodsmith* No. 20. I also used the new *Sears* combination edge guide and trammel point attachment (No. 9 HT 25179) to rout the circles on the frame.

Armed with these two attachments and I was ready to cut some wood.



THE WOOD FRAME

The Lazy Susan consists of two parts: the circular wood frame, and a circular insert. The wood frame actually starts out as an octagon, see Fig. 8.

I cut the eight pieces for the octagon from an oak board 3" wide and 48" long. Each piece is cut to a rough length of 6", and then 22½° miters are cut on both ends of each piece so their final length (from point to point) is 5⅛".

SPLINE GROOVES. Next, grooves for the splines are cut on the mitered ends of each piece. I used the router table with a ⅛" straight bit to through-cut these grooves (from edge to edge) so the spline would show on the perimeter of the frame.

The router table is ideal for this kind of exposed-spline joint because the router bit cuts a nice flat-bottomed groove. (See page 8 for more on this technique.)

To join the eight pieces, I cut splines out of some scrap walnut. These splines are a little tricky to cut because they must fit tight enough so there's no gap in the grooves, but not so large that you can't get a tight fit at the joint lines. (It took three times before I got the size I wanted.)

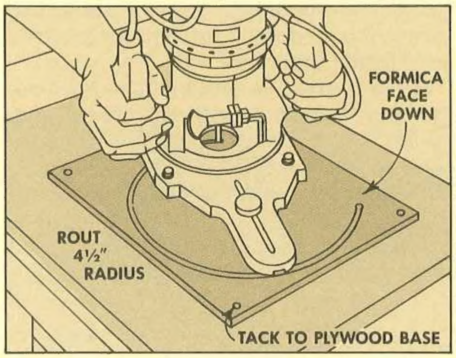
Next, I started gluing-up the frame. I glued pieces together to form a total of four pairs. Then I glued pairs together to form two halves. Before assembling the two halves, I used the jig described on page 17 to trim the four mating edges of the halves for a good fit.

THE CIRCULAR INSERT

Before doing any routing on the frame, it's best to cut the circular insert first. The insert shown here starts out as a 14" square made by laminating a piece of white *Formica* to a piece of ¼" plywood. However, before laminating, drill a ⅛" hole in the center of the plywood. (This will be the pivot hole for the trammel-point attachment.) Then bond the *Formica* and plywood with contact cement.

To cut out the circular insert, tack the four corners of the laminated square to a plywood backing board. Then I used a *Sears* router and trammel-point attachment to rout a 4½"-radius circle, Fig. 1.

There is one problem here. The stem of the trammel attachment is too long to fit in the shallow pivot hole in the plywood. This may cause the trammel attachment to bend as you're routing — thus creating a slightly beveled edge on the circular insert. This edge can be sanded square, or left as is; either way will work.



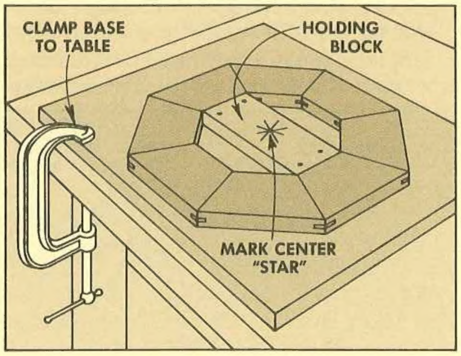
1 *Laminate* Formica *to ¼" plywood and tack it (face down) to a plywood backing board. Use trammel-point attachment to rout outside perimeter 9" in diameter.*

ROUTING THE FRAME

Three circular cuts must be made on the octagonal frame. To hold the frame steady for these cuts, I cut a small holding block to fit (very tight) between two inside edges of the frame, Fig. 2. This block is tacked to the plywood backing board.

To find the center point for the pivot hole place a ruler at each joint line and mark a center "star" on the holding block.

OUTSIDE CIRCLE. In order to cut the outside perimeter of the frame, I drilled a pilot hole in the frame so I'd have a place to lower the bit for each pass and to start the cut without tilting the router, Fig. 3. This hole is drilled so the *inside* edge is 6" from the center pivot hole.



2 *Cut eight pieces for octagon and join with splines. Then cut a holding block to fit between inside edges. Find center for pivot hole by marking a "star" on block.*

Place the router bit over the pilot hole, and lower it to a depth of about ¼". Then move the router in a clockwise rotation to rout the circle. Just keep lowering the bit and making passes until the outside of the frame breaks free, Fig. 4.

BOTTOM RABBET. I must admit the inside for the *Formica* insert is a bit of a challenge. To get a little practice, I cut the rabbet on the bottom of the frame first. The depth of this rabbet should be $^{3}/_{16}$" (to accept the Lazy Susan turntable).

To get the width I needed, I started on the *inside* perimeter of the octagon, and slowly worked my way out (with successive passes) to the final diameter, Fig. 5.

Although the diameter of this rabbet is not critical, I used it as a practice run for the one on top (for the *Formica* insert). When I got close to the exact diameter of the insert, I loosened the knob on the trammel point attachment, and kind of bumped the router bit into the shoulder (with the router running) — just enough to make a little dent in the shoulder — and then made another circular pass. This way I could sneak up on the final pass (which must fit the *Formica* insert exactly).

With this bit of experience under my belt, I flipped the frame over and cut the circular rabbet on the top to accept the *Formica* insert. (Follow the same procedure, except the depth of cut must match the thickness of the insert.)

FINAL STEPS. The last step on the frame is to round over the top and bottom edges with a ¼" quarter-round bit. This can be done on the router table or with the trammel point attachment.

Then I glued the *Formica* insert into the top rabbet, and finished the wood frame with two coats of *Watco* Danish Oil.

Finally I put some felt pads on the bottom of a 6" Lazy Susan turntable and then mounted it to the bottom of the frame with #6 x ⅜" roundhead screws. The turntable (Catalog No. 28977) and the felt pads are available from *The Woodworkers' Store*, 21801 Industrial Blvd., Rogers, MN 55374, (612) 428-3200.

FIGURE 6

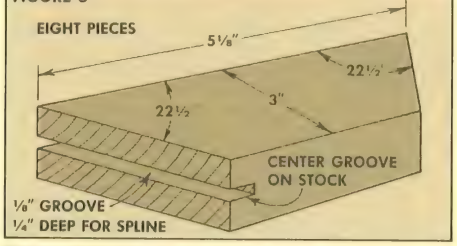


FIGURE 7

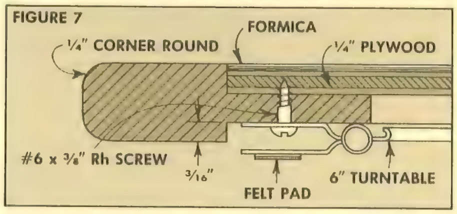


FIGURE 8

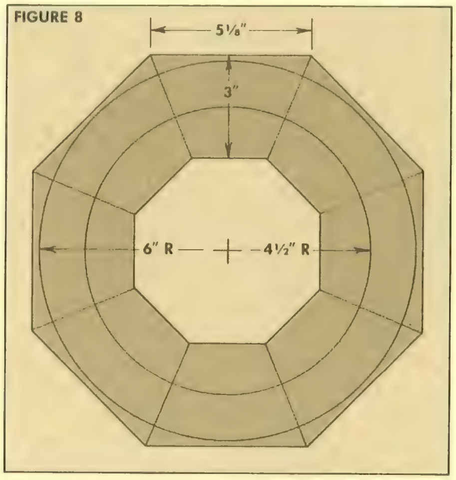
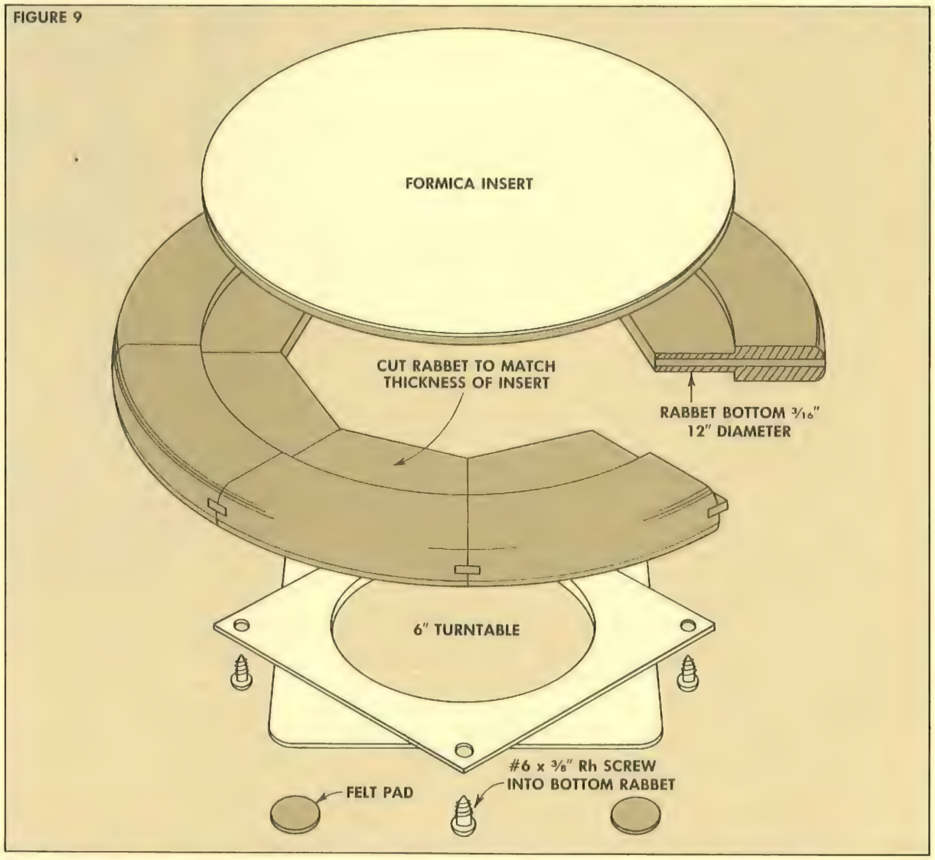
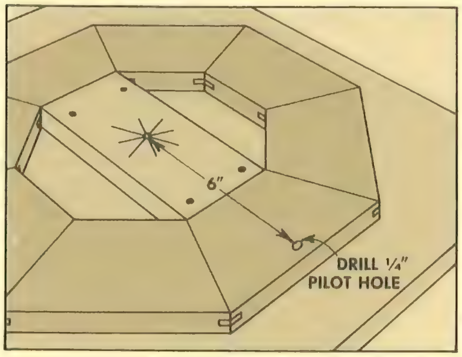
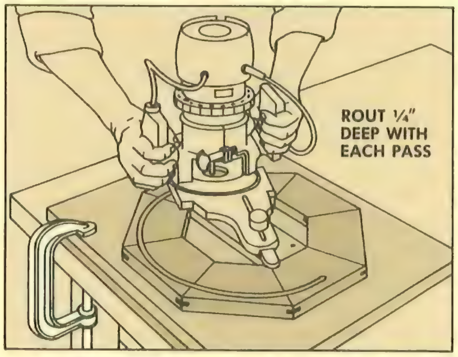


FIGURE 9

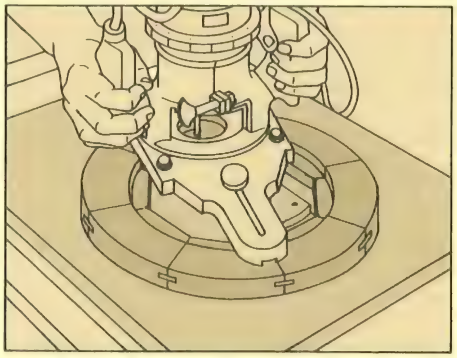




3 *Drill a ⅛" center pivot hole for stem of trammel-point attachment. Then drill ¼" pilot hole so the router bit can be lowered to make outside cuts.*



4 *Adjust trammel point to rout a 12" diameter circle on outside edge. Lower bit in pilot hole and make successive passes until outside waste breaks free.*



5 *Adjust trammel point to rout inside circle. Start on inside of frame and slowly work out to diameter of* Formica *insert using method described in text.*

Curio Cabinet

IN SIGHT, BUT OUT OF HARM'S REACH

Designing this Curio Cabinet called for what seemed to be a contradiction. It should have a light and airy feeling so it doesn't overwhelm the contents that are on display. Yet, it should be substantial enough so the contents seem protected.

With that in mind, Ted designed this cabinet around a whole series of wooden frames — some with wooden panels, and some with glass. The net effect is, I think, a nice little display case.

Once we got the design work out of the way, we got down to the fun part: the woodworking.

THE INSIDE FRAMES

I started with the three frames on the inside of the cabinet, and worked my way out. Each of these frames is built the same way: with miter and spline joints at each corner, see Fig. 1.

JOINING THE FRAMES. First, I ripped enough wood 2⅛" wide for the three frames (six long and six short pieces), and cut each piece to rough length. Then I mitered both ends of each piece at 45° so the front/back pieces (A) were 19" long, and the side pieces (B) were 12" long.

Next, spline grooves are cut in the mitered ends of each piece. The easiest way to cut these grooves is on a router table. (See page 8 for more on this technique). After the grooves are cut, splines are cut to fit the grooves.

THE BOTTOM FRAME. The bottom frame receives a panel, so ¼" x ¼" grooves are cut along the inside edges of each frame piece, Fig. 3.

Since the panel (C) for this frame can be seen through the glass door, I decided to build it out of solid wood. After I glued up enough wood for the panel, I trimmed it to size so the dimensions were ⅛" *less* than the groove to groove measurements of the frame, see Fig. 3. (This ⅛" gap is necessary for expansion/contraction of solid-wood panels.)

Next, tongues are cut on all four edges of the panel to fit in the grooves in the frame. I cut these ¼" x ¼" tongues on the router table with a rabbet bit.

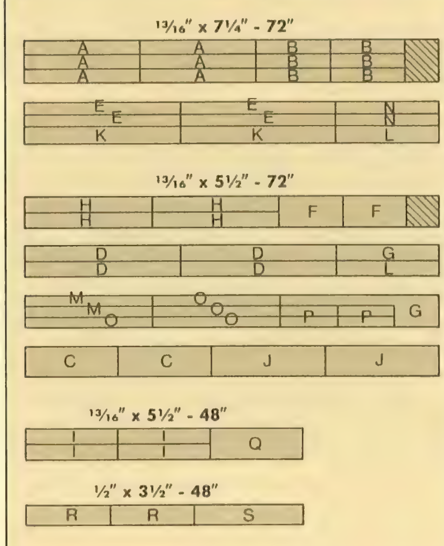
When gluing-up this frame, be sure the splines are positioned so they don't interfere with the panel, see Fig. 2. However, the panel is not glued in the grooves — it must be free to "float."

OUTSIDE TONGUES. The last step is to cut a ¼" x ¼" tongue on the outside perimeter of all three frames. Once again, I used the router table and a rabbet bit to cut these tongues.

MATERIALS LIST

A	Inner Frame Frt/Bk (6)	13/16 x 2⅛ - 19
B	Inner Frame Sides (6)	13/16 x 2⅛ - 12
C	Inner Frame Panel	13/16 x 8⅛ - 15⅛
D	Corner Frt/Bk (4)	13/16 x 2⅛ - 26
E	Corner Sides (4)	13/16 x 1¾ - 26
F	Aprons (2)	13/16 x 5¼ - 10½
G	Filler Strips (3)	cut to fit
H	Top/Btm Frame (6)	13/16 x 2⅜ - 21½
I	Top/Btm Frame (6)	13/16 x 2⅜ - 14½
J	Top Panel	13/16 x 10⅛ - 17⅛
K	Base Frt/Bk (2)	13/16 x 2¾ - 21⅞
L	Base Sides (2)	13/16 x 2¾ - 14⅞
M	Door Frame Stiles (2)	13/16 x1¾ - 20½
N	Door Frame Rails (2)	13/16 x 1¾ - 16
O	Side Frame Stiles (4)	13/16 x 1¾ - 20½
P	Side Frame Rails (4)	13/16 x 1¾ - 9
Q	Drawer Front	13/16 x 4 - 16
R	Drawer Sides	½ x 3⅜ - 12
S	Drawer Back	½ x 2⅞ - 14
T	Drawer Bottom	cut to fit
U	Plywood Back	¼ x 16 - 25½

CUTTING DIAGRAM



THE CABINET FRAME

The three inside frames are held together with the next layer of frames — the eight corner pieces for the cabinet. The four front/back corner pieces (D) are ripped to a width of 2⅛". The four side corner pieces (E) are ripped to a width of 1¾". All eight pieces are 26" long.

SHOULDERED QUARTER-ROUND. The four front/back pieces (D) are joined to the side pieces with a simple rabbet joint. But to give this joint a little more class, I made a shouldered quarter-round cut on the outside corner of each piece.

Next, a rabbet is cut on the inside corner to accept the side corner piece (E), see Fig. 4. The rabbet should be cut so the side piece (E) sticks out to form a shoulder equal to the shoulder on the front piece, see detail in Fig. 6.

SIDES AND APRON. The next step is to cut two aprons (F) to fit between the side corner pieces (E). These aprons are joined to the sides with a mortise and tenon joint.

If you're not particularly fired up to cut a mortise and tenon, you could achieve the same effect by cutting ¼"-wide stopped grooves on the inside edges of the side pieces and in the end of the apron, and join the two pieces with a spline.

DADOES. Finally, dadoes are cut in the eight corner pieces and the two aprons to mate with the tongues that are already cut on the inside frames.

The dadoes at the top and bottom of each corner piece are cut so the face of the frames are flush with the top and bottom ends of each corner piece. When cutting these dadoes, I guided the pieces with the miter gauge and used the rip fence as a stop. Then when the grooves in the aprons are cut, I used the same setting on the rip fence so these grooves would be lined up.

The dado for the middle frame (which supports the drawer) is cut so it's centered 4¼" down from the center of the top dado.

ASSEMBLY. Before assembling all of these pieces, I finish sanded them — it's a whole lot easier to do it now than after assembly. Then I started assembly by gluing the aprons (F) and the sides (E) together.

Now these two assemblies, plus the four front/back corner pieces (D) are all glued to the three inside frames. I applied glue to the dadoes and rabbets in each piece and added them one by one. This whole assembly is held together with band clamps. (Be sure to check the square of the cabinet as the band clamps are tightened.)

FILLER STRIPS. At this point the cabinet is starting to look pretty good — except for the tongues sticking out on the front and back edges of the inside frames. These tongues are covered with filler strips.

The filler strips (G) that fit on the top and bottom frames should be the same

FIGURE 1

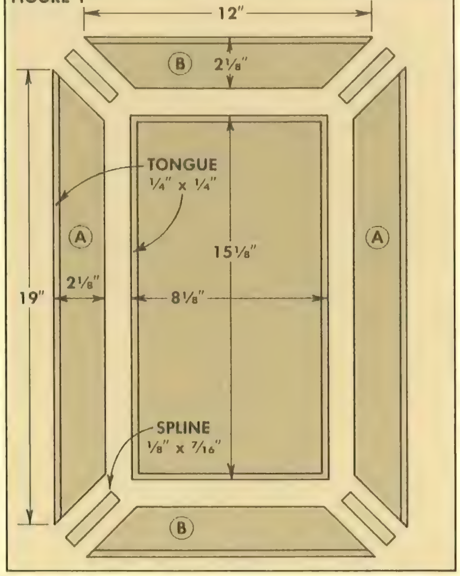


FIGURE 2

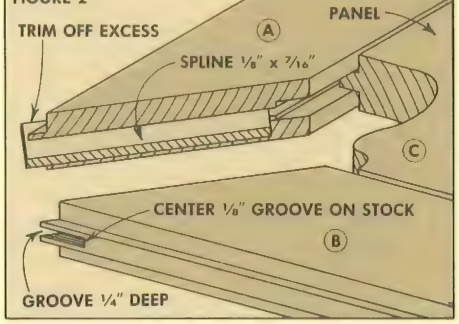


FIGURE 3

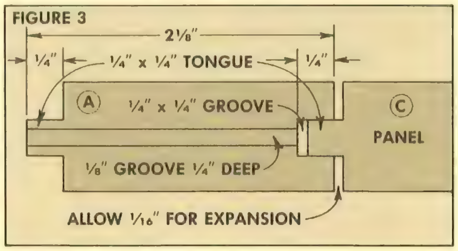


FIGURE 4

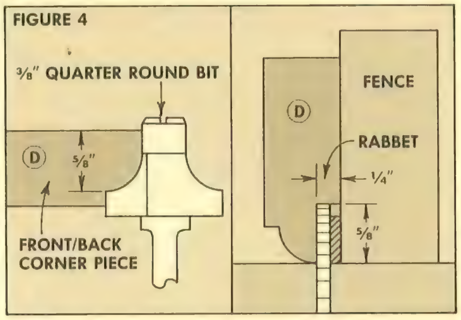


FIGURE 5

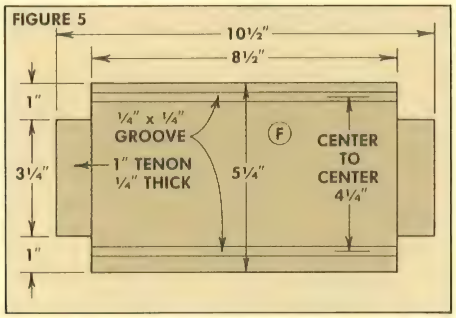


FIGURE 6

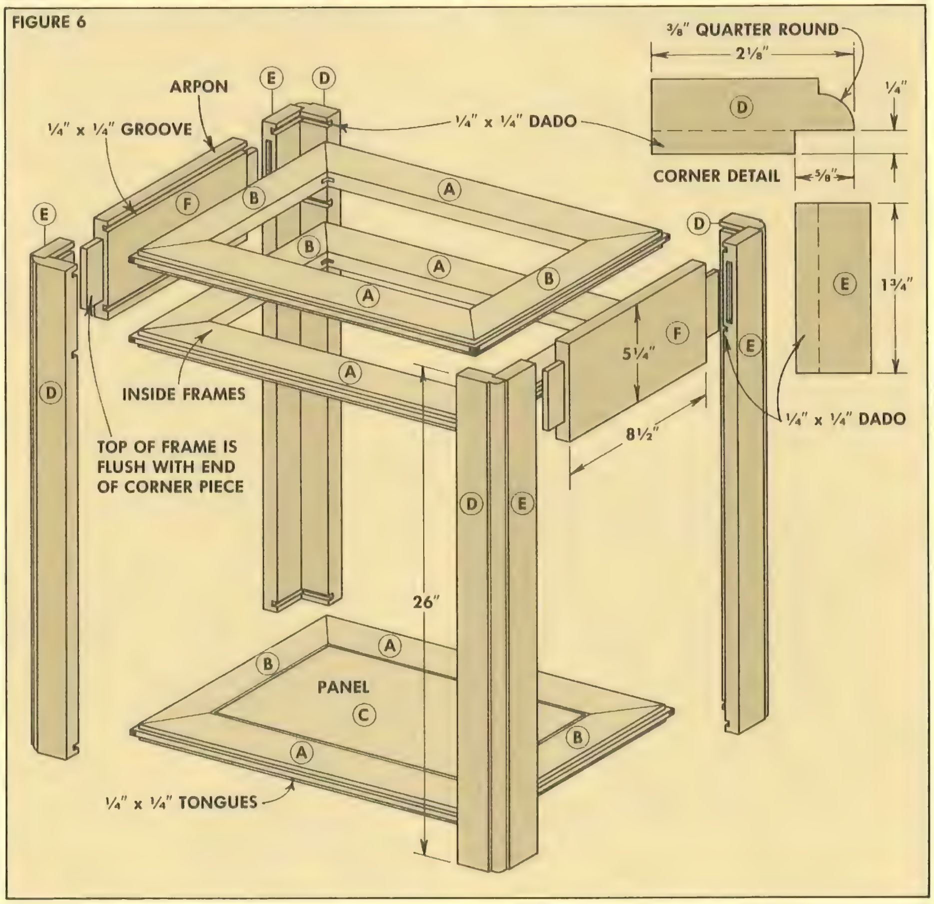


FIGURE 7

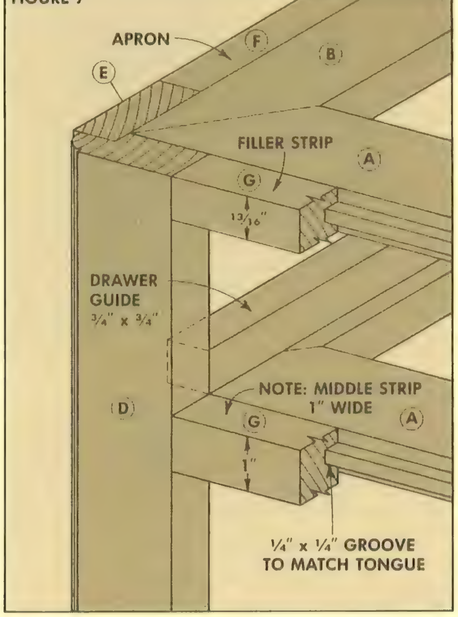


FIGURE 8

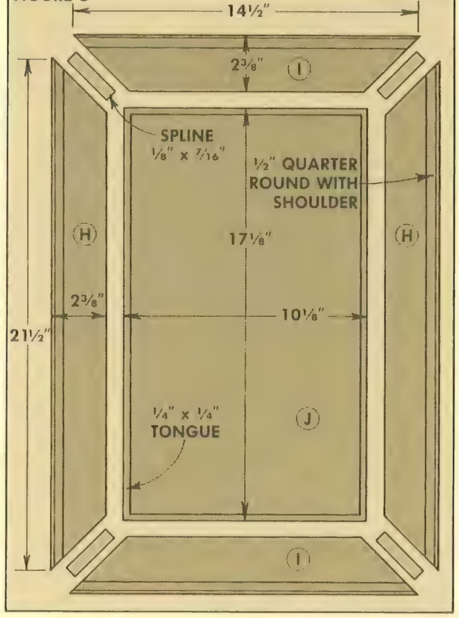


FIGURE 9

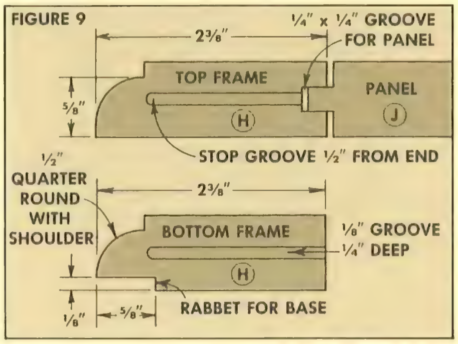


FIGURE 10

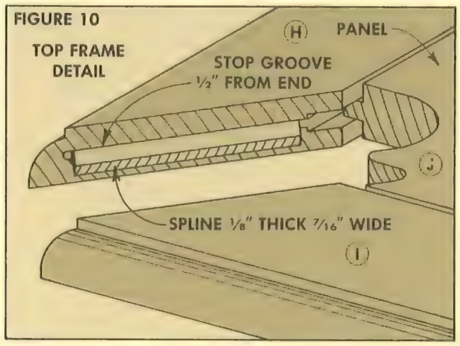


FIGURE 11

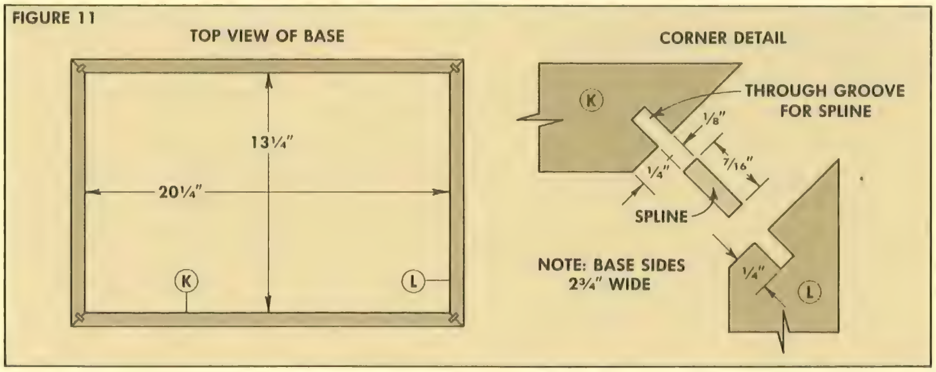


FIGURE 12

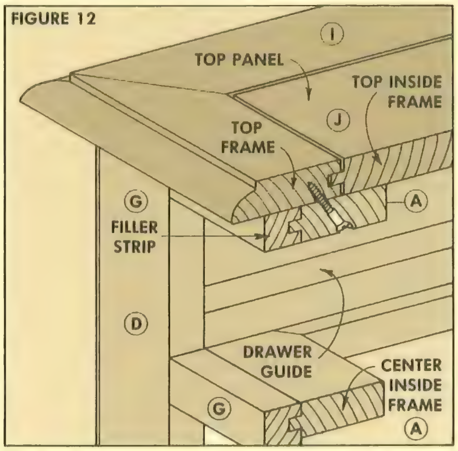
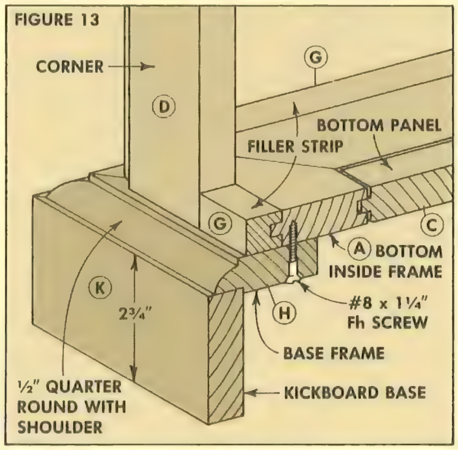


FIGURE 13



thickness as the frames. However, the strip on the middle frame should be flush with the top of the frame and extend ¼" below the bottom of the frame, Fig. 7.

TOP AND BOTTOM FRAMES

Once again you have to make two more frames joined with a miter and spline. One of these frames is for the top of the cabinet, while the other frame is part of the base of the cabinet.

Since both frames are the same size, I started by ripping four long pieces (H) and four short pieces (I) to $2\frac{3}{8}$" wide. The length of each of these pieces is shown in Figure 8. That is, these are the lengths if everything has gone perfectly up to now. In reality, these pieces are cut to fit the actual dimensions of the cabinet.

The bottom frame has the most critical fit because of the way the shouldered quarter-round fits around the perimeter of the cabinet, see Fig. 13. I got the measurements for this frame, and used it as a standard for the top frame.

Measure the width and depth of the cabinet as it stands. Add the width of both quarter-round cuts (this should be a total of 1"), and then add an extra ⅜". This extra ⅜" is for the space between the quarter-round cut and the perimeter of the cabinet. Now, all eight pieces for both the bottom and top frames can be cut to these measurements.

TOP FRAME. After the pieces for the top frame are cut to length and the ends are mitered, stopped spline grooves must be cut on each mitered end. Then ¼" x ¼" grooves are cut on the inside edges.

Next, a panel (J) is built to fit inside this frame. The panel is glued up of solid wood and then cut to size ⅛" smaller than the groove to groove measurement. Finally ¼" x ¼" tongues are cut to fit in the grooves in the frame, Fig. 9.

Before attaching the top frame, the drawer runners should be screwed into place, Fig. 7. Then a ¼" x ¼" rabbet is cut around the entire back side of the cabinet for the ¼" plywood back.

BOTTOM FRAME. Now back to the bottom frame. The four pieces for the bottom frame are already cut to length and mitered, so all that's left is to cut the stopped spline grooves. Before assembling this frame, rabbets are cut along one edge to accept the base (kickboard).

THE BASE. At last there's something easy. The base is just four boards (M and N) joined with a miter and spline. After it's assembled, the bottom frame is glued onto it. Then this assembly is screwed to the bottom of the cabinet, Fig. 13.

GLASS DOOR AND SIDE PANELS

The glass door and the two side panels are miter-and-spline frames. (We wouldn't want to break the monotony at this point.)

Although the basic construction of these frames is exactly like all the rest of the frames, there are a couple of little changes.

All 12 pieces for these frames are ripped to a width of 1¾", and cut to rough length. Then all pieces are cut to final length (mitered) to fit the openings in the cabinet. (To get these pieces to fit, measure the openings and add a total of ½" — this is so the frames overlap the openings ¼" on each side.)

SPLINE GROOVES. Here are the changes. On these frames the spline grooves are cut all the way through (from edge to edge), and they're positioned off-center so they don't interfere with the molding cuts on the face of the frames.

First, I made the molding cuts on the inside edges of all these pieces with a ¼" quarter-round bit, leaving a ⅛" shoulder. Then I cut a ¼" wide by ⅜" deep rabbet below the molding cut, Fig. 15.

The spline grooves can now be aligned and cut so they don't trim off any part of the quarter-round cut. Next, the splines are cut and the frames are assembled.

After the glue is dry, the same type of ¼" quarter-round cut is made around the outside edges of each frame.

RABBETS. The rabbets on the outside edge of the door frame and the side frames are slightly different. On the side frames the rabbets are cut so the frames fit tightly in the openings. It's best to sneak up on the cuts to get a snug fit. Then these frames are glued into the openings.

The rabbets on the door frame are cut ⅜" wide so there's enough clearance for the hinges (Fig. 17), and so the door can be opened easily.

THE GLASS. Once the frames are built, they need some glass. I took the frames to a local store to have the glass cut to size. While they were at it, I had them cut a glass shelf for inside the cabinet.

The glass shelf is mounted with small L-bracket shelf supports. The glass for the doors and side panels is mounted with ¼" x ¼" stops.

THE DRAWER. The last step on this cabinet is to build the drawer. The drawer front is lipped, which means there are rabbets on all four inside edges. Once the drawer front has been rabbeted (see Fig. 19), the sides are joined to the front with a half-blind rabbet and dado joint. Then the back is joined to the sides with a normal rabbet and dado.

Before assembling the drawer, I cut one more shouldered quarter-round cut around the perimeter of the drawer front.

FINISHING. To finish this cabinet I applied two coats of *Minwax* Walnut stain. When the stain was thoroughly dry, I brushed on three coats of *Hope's Tung Oil Varnish*. This oil finish has just enough varnish in it to add a gloss to the finish, and it's very easy to apply.

FIGURE 14

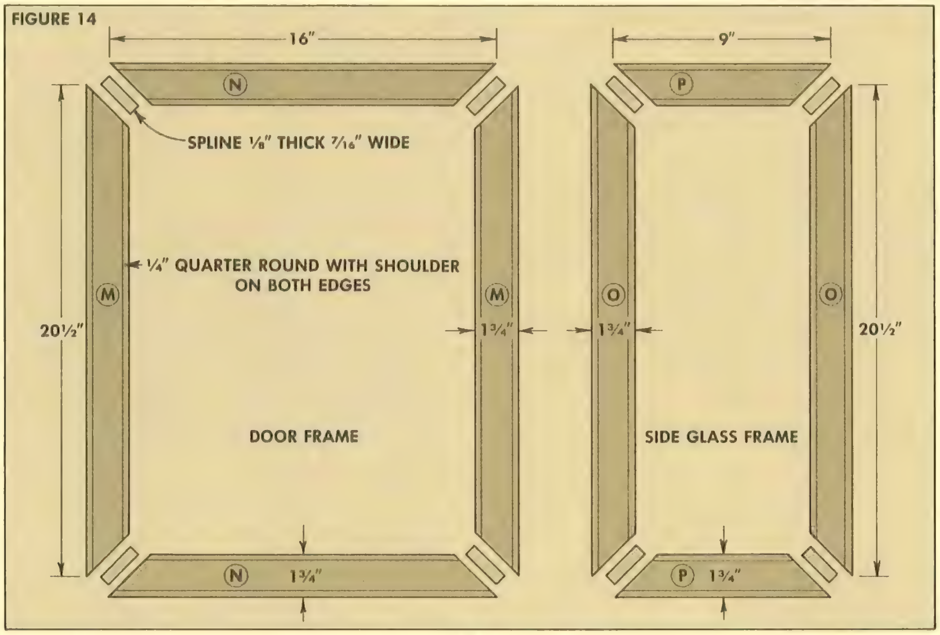


FIGURE 15

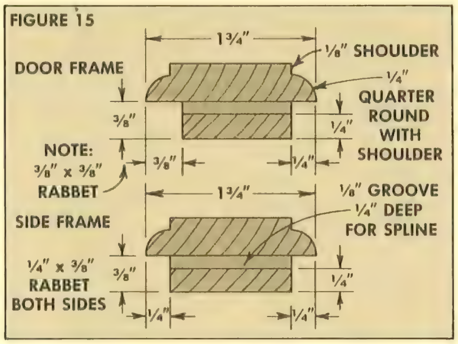


FIGURE 16

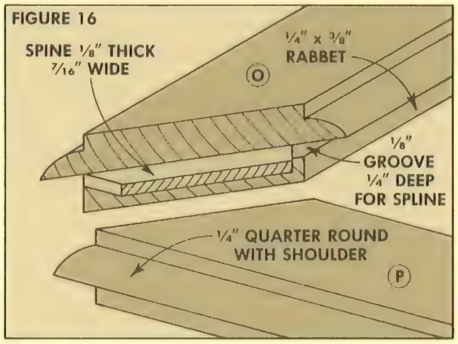


FIGURE 17

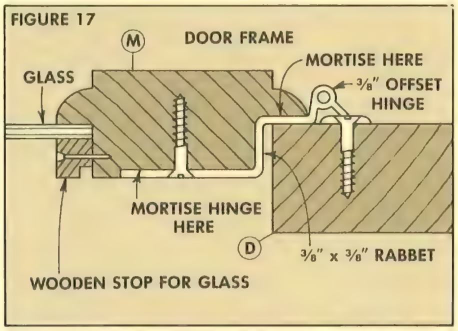


FIGURE 18

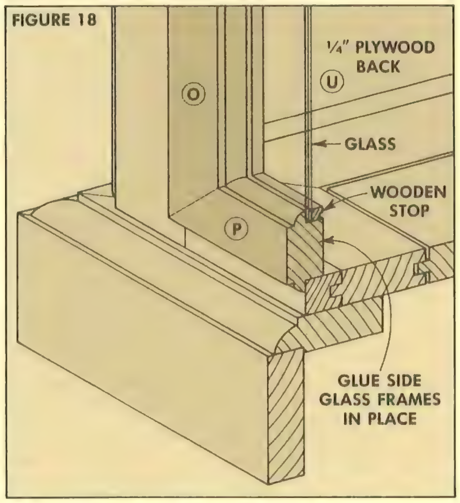
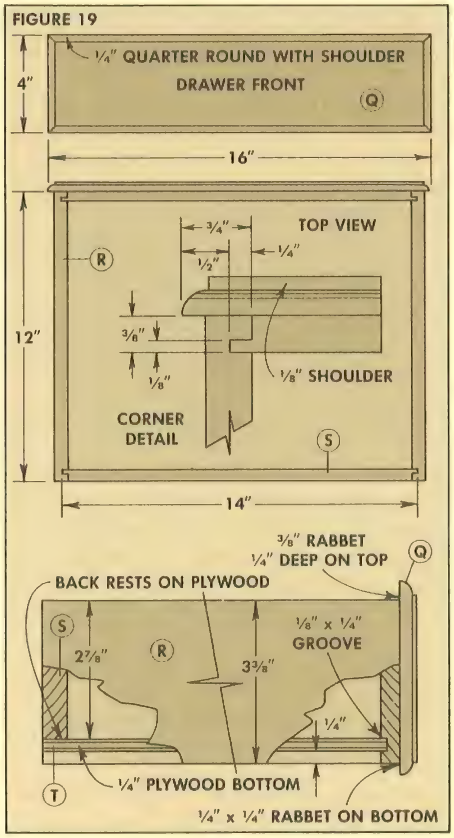


FIGURE 19



Hall Mirror

A GOOD LOOKIN' PROJECT

We designed this hall mirror as a companion piece for the Curio Cabinet shown on page 12. (The photo at right shows what a handsome couple they make.)

As with the Curio Cabinet, the frame for this mirror is constructed with miter and spline joints. And once again, I cut these joints on a router table. I also used a *Sears* router and trammel-point attachment to cut the half-round section at the top of the frame.

THE ROUND TOP. To build the frame, I started at the top and worked my way down (that's the story of my life). The half-round section at the top starts out as half of an octagon.

First I cut the four pieces (A) 3¾" wide and about 9" long. Then I mitered both ends at 22½° so the final length (from point to point) was 8½".

Next, stopped grooves are cut for the splines. These grooves must stop no more than 2¼" from the inside edge to leave enough room where the half circles will be routed, Fig. 1.

ASSEMBLY. When gluing these pieces together, the two open ends of this half-octagon should form a straight line. They didn't on mine, so I used the jig (shown on the next page) to trim the ends square.

ROUTING THE TOP. After trimming the ends, I left the half-octagon tacked to the jig (which is just a piece of plywood) in order to make the two circular cuts to form the half-round top. To make these cuts, I tacked a piece of scrap pine to the edge of the plywood. Then I drilled a ⅛" pivot hole for the trammel attachment.

To rout the half circles, I made successive passes with a ¼" straight bit. When routing the inside radius, the trammel attachment is set so the distance between the pivot hole and the *outside* edge of the bit is 7⅝". For the outside radius, set the distance between the pivot hole and the *inside* edge of the bit at 10". These settings make the frame 2⅜" wide.

THE SIDES AND BOTTOM. Once the half-circle top is cut, the two sides (B) are cut to width (equal to the width of the half-circle). Then the bottom ends are mitered at 45° so the final length is 38".

The bottom piece (C) is also mitered at 45°, making sure the point to point length is equal to the outside diameter of the half-circle, see Fig. 4.

Finally, these three pieces are added to the half-circle top with miter and spline joints to complete the frame.

MOLDING AND RABBET CUTS. After the glue was dry on the frame, I cut a shoul-

FIGURE 1

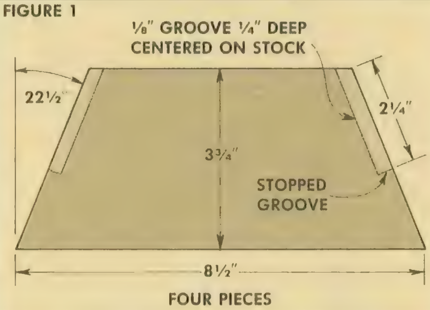


FIGURE 2

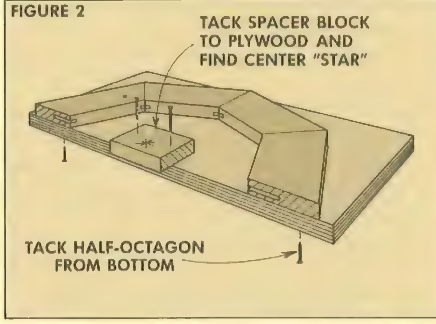


FIGURE 6

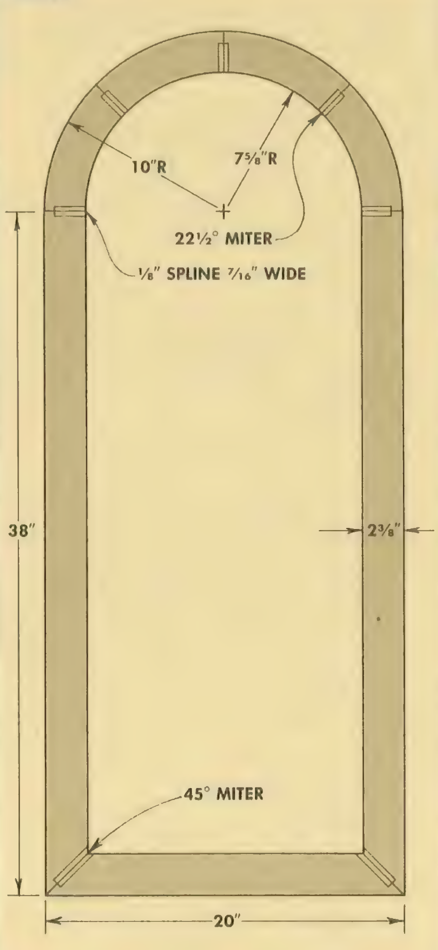


FIGURE 3

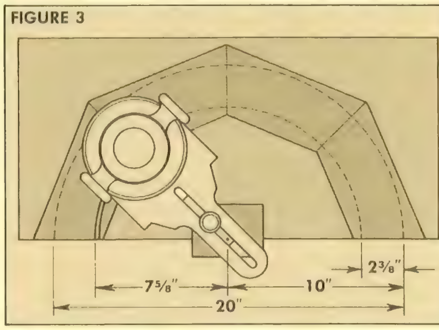


FIGURE 4

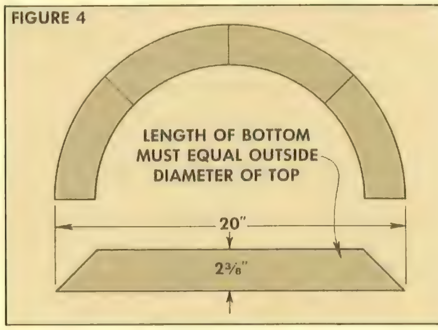
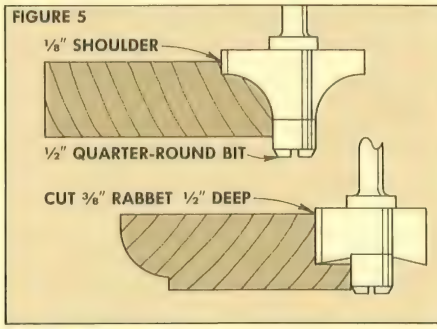


FIGURE 5



dered quarter-round edge along the entire perimeter of the frame, moving the router in a *counter-clockwise* rotation.

Then I cut a ½"-deep by ⅜"-wide rabbet on the inside of the frame for the mirror. Here I used a rabbet bit with pilot, moving the router in a *clockwise* rotation.

FINISHING. I finished this frame to match the Curio Cabinet (*Minwax* Walnut stain and *Hope's* Tung Oil Varnish). Then I cut a piece of ⅛" *Masonite* for a backing piece for the mirror.

MIRROR. The easiest way to cut the mirror is to have someone else do it. I took the frame to a local store and asked them to cut a mirror to fit. I also left the *Masonite* backing with them, and they kindly installed the mirror and backing piece in the frame. When I got it back, I screwed two round-head screws in the back and ran picture-frame wire between them to hang the mirror.

Miter Tip

JOINING AN OCTAGON

When you're cutting miters for an octagonal (eight-sided) frame the chance for error increases dramatically. Each piece for the frame requires two cuts at 22½° — for a total of 16 mitered cuts at this angle. If your setting is off just ¼-degree, the combined gap would be about ¼".

If the joints are off, you could recut all the miters, and probably wind up even farther off in the other direction. Instead, some minor adjustments can be made during assembly. First, I glue pieces together to form two halves of the octagon. It would be nice if the four open ends of these two halves fit together perfectly. But that rarely happens.

As long as the gap between these two halves is not more than ⅛", corrections can be made for a perfect fit. I use the jig shown in Fig. 1.

First I rip a clean edge on a piece of plywood. Then I lay the assembled half-octagon face down and tack the plywood to it. (This means the nail holes will be on the back side of the octagon.)

The key thing here is the placement of the octagonal half on the plywood. If the miters were cut perfectly, all four corners of the miters would rest on the very edge of the plywood. But since they're probably off, you want to position the assembly so the two long corners extend beyond the edge of the plywood, and the two short corners are right on the edge, see Fig. 2.

Place the jig on the saw to make a trim cut. The blade should just barely skim along the edge of the plywood — trimming off the long corner. This insures that you're changing the original angle (and the depth of the spline groove) as little as possible.

Repeat the same procedure for the other half-octagon, and you should wind up with a perfect fit.

FIGURE 1

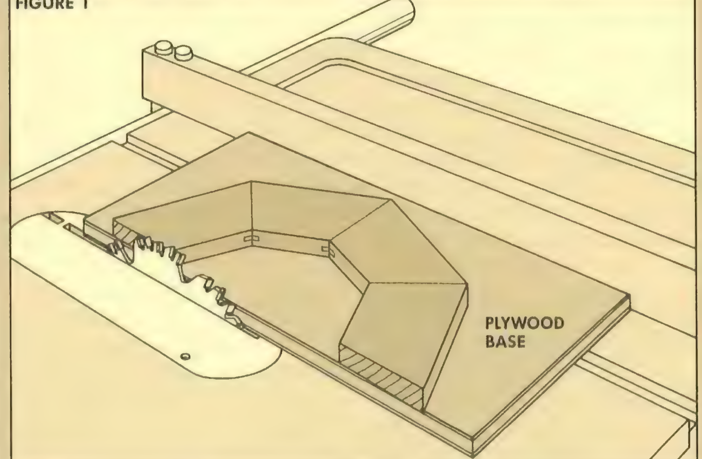
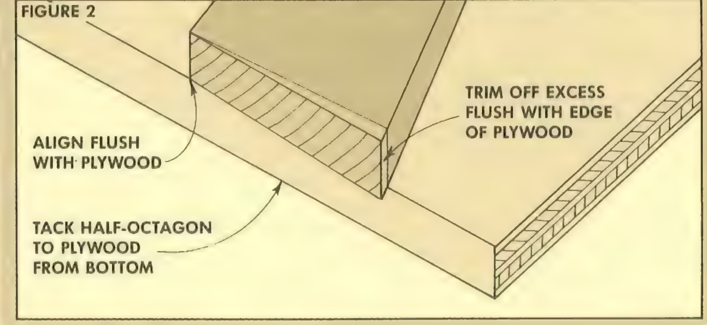


FIGURE 2



Turned Fruit Bowl

STEP-BY-STEP TO TURNING A BOWL

We've received dozens of requests for lathe projects and we've had a lot of discussions about what kind of project to do. We finally decided to turn a bowl (faceplate turning) because it's the one project that can be accomplished start-to-finish on a lathe, and stands alone when it's done.

Turning this fruit bowl requires several basic turning techniques. Yet, it doesn't require years of experience or any really special tools or equipment.

The bowl is designed with a shallow slope on the walls so you can turn it without a lot of the problems associated with deep-sided bowls. Also, the unusually wide rim creates an appearance of very thick walls . . . eliminating the need for absolutely uniform wall thickness. (The walls can be any thickness you like without affecting the final appearance of the bowl.)

And finally, the base (also turned on the faceplate) is fastened to the bowl with a round (turned) tenon. This is a practice often used in turned projects that have a pedestal or base.

CUTTING VS. SCRAPING. Before getting to the details on this bowl, I'd like to mention that most of the work is done with a cutting (rather than scraping) action. Although scraping the bowl would have been much easier (there's really not much skill required in using a scraper), it would have taken much longer to turn, and the final finish would have been poor at best.

The speed with which a bowl can be turned by cutting, and the finish that can be obtained are really enough reasons to learn the techniques required to cut with a gouge. But the real thrill is in seeing all those shavings on the top of the bench that are the result of cutting.

Now that I've recommended a cutting action, I should admit that I used a combination of cutting and scraping on this bowl. By using scrapers for finishing work, you can actually improve the finish left by the gouge. And there are times (as in cutting the underside of the rim) that scraping is either the only way possible to make a cut, or it may just be safer.

THE TOOLS. I used only five tools to turn the fruit bowl. (See page 22 for a detailed explanation of the tools used.) A ½" shallow spindle gouge (that's been reground) does the majority of the turning. A domed scraper is used after the gouge for cleaning up end grain problems. A ½" light scraper is used to form the underside of the rim. A ½" skew is used to cut the bead in the pedestal. And finally, a parting tool is used to cut the round tennon.

THE BOWL BLANK. To turn this bowl you'll need a blank 12" square by 3¼" thick. The first step is to cut 7 pieces out of 8/4 (1¾" -thick) lumber. Each piece is 3¼" wide by 12" long. All 7 pieces are laminated (face to face) to form the 12"-square blank. (The bowl in the photo is glued a little differently because I was using small scraps from around the shop.)

After the blank is glued-up, it's planed smooth on the face that will be attached to the faceplate. Finally, to make the initial truing-up safer, I cut the bowl blank to a 11½" diameter circle on a band saw.

Once the block has been band-sawn, attach a 6" diameter plywood disk (the same size as the faceplate) to the block and let the assembly dry for 12 hours.

SHOP NOTE. Because I used hard maple, the bowl blank was extremely heavy. So I glued the plywood disk directly to the bowl blank without the usual paper insert. I felt by doing this, I would achieve a stronger bond without having to worry about the paper separating while I was turning.

When the glue is completely dry, the faceplate is mounted to the plywood disk with #14 woodscrews. Then the faceplate is attached to the head stock of the lathe.

TRUING THE BOWL BLANK

I used a ½" spindle gouge to turn the bowl blank true with the center. Any gouge will work for truing the blank, but I find the small ½" gouge works well.

Position the short tool rest so that it's the same height as the center point of the bowl blank, and adjust it so that it's parallel to the edge of the block and about ⅛" to ¼" away from the widest point. (It's best to rotate the lathe by hand to be sure the tool rest clears the bowl blank on all sides.)

Because of the large size of this bowl, and the fact that it hasn't been trued with the center yet, you'll want to set the speed of the lathe as slow as possible. Until the bowl blank's outside edge has been trued, it's also a good idea to bring the tail stock up to the blank to steady it, see Fig. 1.

To true-up the blank, start the cut with the handle of the gouge very low, and slowly raise it until the cutting edge just begins to cut, see Fig. 1. Then slide the gouge across the edge, with the "U" facing straight up for the entire pass.

Until there is a surface for the gouge's bevel to rest on, the cutting action will seem a little rough. But as the bowl blank

begins to be trued up, this rough chatter should calm down considerably. (Be sure to make very light cuts at first . . . a heavy cut may chip out a large piece of the blank.)

TRUING THE PLYWOOD DISK. To help keep the entire assembly rotating smoothly, it's a good idea to true the plywood disk after truing the bowl blank.

It may be easier to do this after some of the waste around the base of the bowl is removed, but it should be done before any finish work is attempted. Use the parting tool to make the actual cut, and remove as little material as possible.

TRUING THE FACE OF THE BOWL. After the perimeter of the bowl has been trued, the next step is to true the face. Move the tail stock out of the way and position the long tool rest ¼" away from the face of the bowl blank so it's just below the center point of the blank.

Since there's very little wood to remove, I used a domed scraper to true the face of the bowl blank. Keep the edge of the scraper pointed downward at all times and make only light passes.

LAYOUT. The last step before the bowl is actually turned, is to lay out guide marks for the rim. Outline the rim by marking a pencil line on the face, ¾" from the outside edge. Then mark a line on the perimeter (edge) of the bowl ⅞" from the face.

As for the shape of the bowl, I found it helpful to have several templates made up, some of which are only portions of the profile. (The tinted area on page 21 is a full-size profile of the bowl. It can be traced on poster board for the templates.)

SHAPING THE OUTSIDE WALLS

The first step in turning the bowl is to cut away some of the excess material around the outside of the bowl so the ½" scraper can be used to cut the coved lip. After the lip is cut, work can continue on the outside profile, using the lip for orientation.

REMOVING WASTE. I used the ½" gouge to remove the excess material on the outside of the bowl. Because so much more material needs to be removed from the area around the base of the bowl than near the lip, it's best to begin with short cuts starting about 1" from the left edge, moving the gouge from right to left.

Start each successive pass slightly to the right (closer to the lip). By doing this, you'll be removing more material from the base of the bowl than from around the lip, without having to take any heavy cuts.

When using the gouge, start the cut by addressing the wood with the "U" facing straight up, and the handle held low enough to keep the cutting edge away from the blank. Then slowly lift the handle until the gouge is cutting. As soon as the gouge starts to cut, slowly swing the handle in a counter-clockwise arc, while gently rolling the "U" of the gouge towards the left.

The cutting edge of the gouge should move in a shallow arc — which is a result of the handle moving in a much larger arc. To better describe the handle's movement, think of the movement of the handle's butt in relationship to a clock face, see Fig. 2. The butt of the handle begins the cut in the 6:00 position, and will somewhat follow the perimeter of the clock face in a counter-clockwise rotation (towards your body) until it's in the 3:00 position at the end of the cut.

As the handle is raised through this arc, it may be necessary to let the tool slide sideways (to the left) to make the full cut. The actual shape of the arc will vary to some extent as the bowl profile changes, but it will follow basically the same path.

As the gouge proceeds across the perimeter of the bowl, it must also be rolled on its side slightly as the handle is lifted. If the "U" of the gouge isn't rolled over to the left as it's advanced, you could get a nasty dig-in when the trailing edge of the gouge comes in contact with the wood.

PROBLEMS. The results of this cutting action should be thin shavings and a nice finish on the bowl. Unfortunately, this often isn't the case. Several things may be causing problems. The most common problem is that the gouge isn't sharp. There's really no other way to put this, if it isn't sharp, it won't work.

Another major problem may be that the bevel of the gouge isn't rubbing against the wood correctly. If the handle is raised too high, and the bevel isn't rubbing, the gouge will dig in and scare the . . . unnerve you to say the least.

Then there's another possibility. If the gouge cuts for only part of a pass, then the solution may be to reposition the tool rest. As the shape of the bowl develops, try moving the tool rest so it's somewhat parallel to the side of the bowl. This should make it easier for the gouge to follow the profile of the bowl and continue cutting.

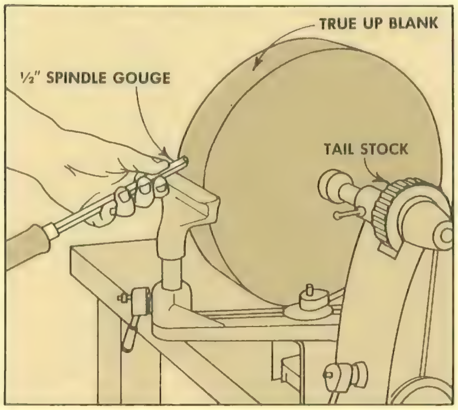
If a continuous cut seems impossible, try cutting for just one half the length of the profile. Then make another, separate cut to complete the pass. As long as the ridge formed between the two cuts isn't too large, it can be removed by the scraper during the finish passes.

SHAPING THE COVED LIP

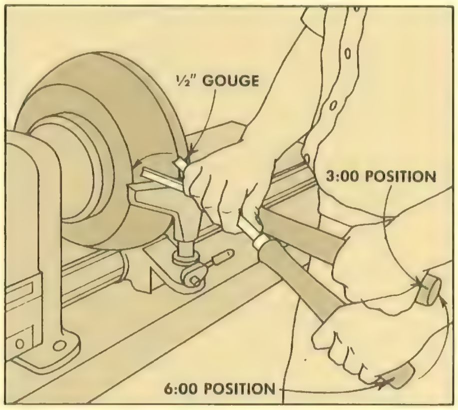
For now you only have to remove enough material so the coved lip can be formed with a ½" scraper. By removing this waste you can use the template to determine the finished profile of the wall. (NOTE: The ½" scraper should be reground to an extreme fingernail shape, see page 22.)

Reposition the small tool rest so that it's just below the center point of the blank. Then, to form the coved lip, take only light cuts with the scraper, see Fig. 3. This tends to take a few minutes to accomplish, but if heavy cuts are made, the tear out will be horrendous. Check the profile of the lip frequently with a partial template.

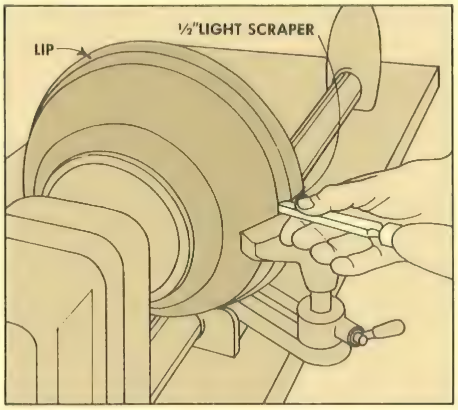
The scraper may need to be resharpened several times before the final shape is achieved. (You can tell when to resharpen the scraper when it produces dust instead of shavings.)



1 *Set the tool rest ¼" away from the widest point, take very light cuts with the ½" gouge. Then proceed across the edge, keeping the "U" facing up.*



2 *Rotate the handle's butt from the 6:00 starting position to the 3:00 position, following the arc shown. Slightly roll the gouge over as it proceeds through the cut.*



3 *Using the ½" light scraper, form the underside of the lip by making very light passes. Use a partial template to check the shape of the lip often.*

After the lip is formed on the underside of the rim, the finished profile on the outside of the bowl can be completed using the ½" gouge. The profile of the bowl will continue beyond the plywood faceplate, but for now, just shape the outside of the bowl up to the plywood disk.

Check the profile often, using the coved lip as a point of reference for the template. When the final pass is about to be made, take a minute to resharpen the gouge to a keen edge. The effort spent here will definitely show in the final finish.

FINISH CUTS. After the outside of the bowl is shaped, the heavy domed scraper is used to clean up the surface, see Fig. 4. (Switch to the small scraper when working near the coved lip.) Be sure that the scraper has a burr on its edge and that it's always held so that it's pointing downward. To achieve a good finish, make only very light cuts with the scraper.

TURNING THE INSIDE OF THE BOWL

To cut the inside of the bowl, set up the large tool rest so it's slightly below the center, and only ¼" away from the face.

PROTECTING THE RIM. The first cut is for the safety of the rim. Use the long point of a ½" skew to cut a V-shaped groove in the face of the bowl at the pencil line, see Fig. 5. By cutting this groove first, the bevel of the gouge will have a shoulder to rest against at the start of the cut. This will prevent it from following its natural tendency to shoot out toward the outside edge, ruining the rim.

REMOVING THE INSIDE WASTE. To position the ½" gouge to start the cut, lay the gouge on its side, with the "U" pointing to a spot slightly above the center of the bowl, and the bevel resting in the groove. The handle should be just a little lower than level and leaning slightly toward the center of the bowl, see Fig. 6.

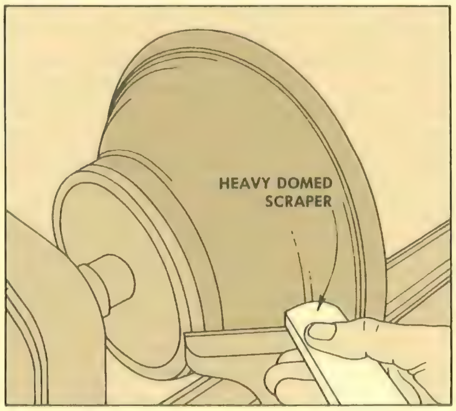
When the gouge is presented to the wood, it should be introduced firmly to start the cut. As soon as the gouge enters the wood, begin to lower the handle and slowly arc the cutting edge of the gouge toward the center of the bowl. As the cutting edge reaches the highest part of the arc, it's gradually rolled over so that the open side of the "U" is pointing towards the center of the bowl.

The gouge should travel in a shallow arc from the outside edge of the bowl to the center. To get this movement, move the handle in an arc toward the body. Using the clock face again, the butt of the handle should start in the 4:00 position at the beginning of the cut and then, traveling clockwise, end up in the 9:00 position as it approaches the center, see Fig. 6. Between the 4:00 and 6:00 positions, the handle is actually being lowered. Then as it continues from 6:00 to the 9:00 position, it is being raised and slightly rolled so the "U" points toward the center. (It may also be neccesary to slide the gouge along the tool rest to make the full cut.)

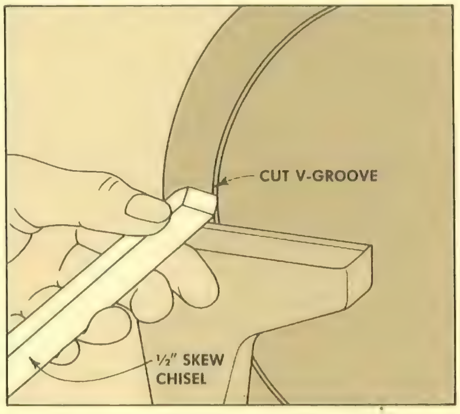
REMOVING THE PINNACLE. The center of the bowl usually creates a small problem. Often times there's an area in the center that the gouge just doesn't want to cut.

There are several ways to attack this problem. If the gouge is almost completely rolled over as it approaches the center, the center pinnacle should be removed. Be careful when trying this. Sometimes the gouge will snap off this center pinnacle and jump to the other side.

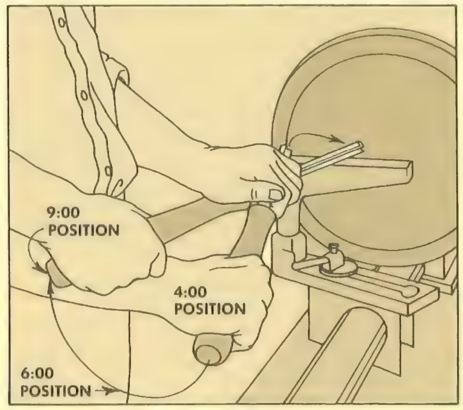
Another approach is to remove the pinnacle after the inside of the bowl is almost



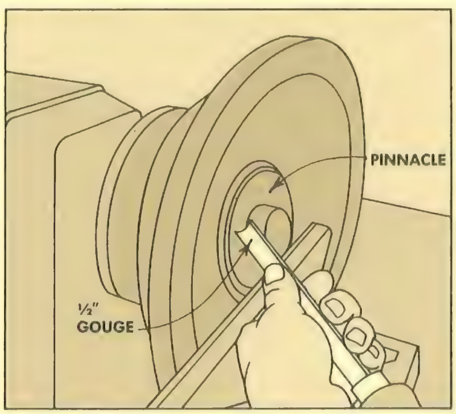
4 *After the finish shape is formed with the ½" gouge, clean up the surface of the bowl with the heavy scraper. Then use the ½" scraper to clean up the lip.*



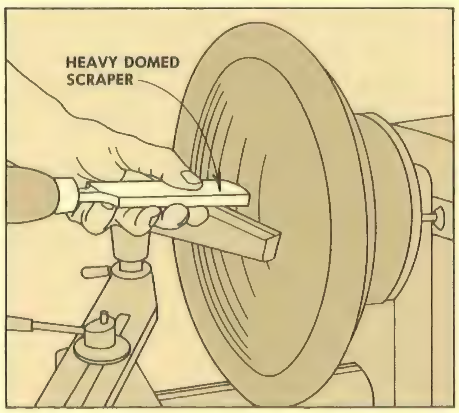
5 *To prevent the gouge from shooting out to the outside edge of the rim as it enters the wood, use the skew chisel to cut a V-groove in the face of the bowl.*



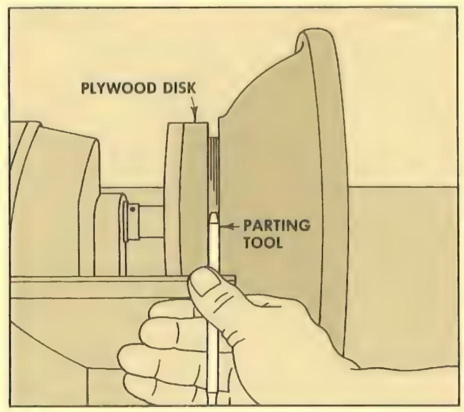
6 *The handle of the gouge travels from 4:00 to the 9:00 position, in the arc shown. Begin to roll the gouge towards the center in the last half of the cut.*



7 *Remove the center pinnacle using the ½" gouge, cutting from the center outward, or with the heavy scraper. Don't let either tool go beyond the center point.*



8 *After the ½" gouge has shaped the inside profile of the bowl, use the heavy scraper to shape the outside lip, and to clean up the inside finish of the bowl.*



9 *When removing the bowl from the faceplate, the parting tool is used to cut off some of the waste. Make the groove slightly larger than the width of the tool.*

completely turned. To do this, place the gouge at the center of the pinnacle and cut towards the outside rim, see Fig. 7. Watch that the corner of the gouge doesn't dig into the bottom of the bowl as it finishes the cut.

The safest, although much slower way is to attack the pinnacle with a domed scraper. Regardless which way is used, be careful not to let the tool pass beyond the center or it will be lifted from the tool rest momentarily and then thrown back down rather hard.

SHAPING THE RIM. After the inside of the bowl is cut to just slightly thicker than finish size, the rim can be shaped.

I waited until the profile on both the outside and inside of the bowl were cut before I shaped the rim. This is a little contrary to common practice, and there's no reason why the rim can't be cut before the inside is shaped.

However, I did find that it was easier to form the rim to look like it was a smooth continuation of the inside profile if it was cut after the inside was shaped.

SHAPING THE RIM. The ½" gouge can be used to cut the rim in the same manner as the outside of the bowl. Or, you may want to shape the rim completely with the domed scraper. I used the scraper. However, if the scraper is used, be sure to make very light cuts to prevent it from tearing the grain.

FINISH CUTS ON THE INSIDE. After the rim was shaped, I used the heavy domed scraper to clean up the inside of the bowl. Once again, I made very light passes, starting at the center and moving out to the rim, see Fig. 8. Make as many passes as needed, or until the results fail to improve. Then sand the bowl inside and out.

REMOVING THE BOWL FROM THE LATHE. The part of the bowl's bottom that's covered by the plywood disk is cleaned up after the bowl is removed from the faceplate. If there's a lot of excess wood to be removed, you may want to cut the bowl off the plywood with the parting tool, see Fig. 9.

Before the bowl was removed, I finished it with a coat of *Renaissance* wax and buffed it to a high gloss. Then I removed the faceplate from the bowl, and chopped off the plywood disk with a chisel.

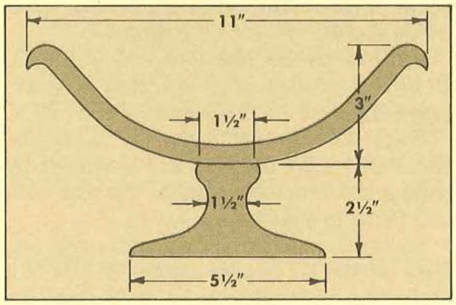
There should be a ring of waste wood on the bottom of the bowl. Use this ring and a small compass to find the center of the bowl. Then mark the center with an awl.

FINISHING THE BOTTOM. To finish the bottom of the bowl (that was covered by the plywood disk), I sanded a flat area flush with the bowl's outside profile with a *Rockwell Speed Bloc* sander. Then I gave this area a coating of *Renaissance* wax and buffed it to match the rest of the bowl.

DRILL THE ATTACHING HOLE. Finally, I drilled a ¾" hole, ¼" deep for the round tennon, using the awl mark as the center point. Be sure to check the finish thickness of the bottom with outside calipers before drilling.

THE PEDESTAL

The pedestal for the bowl is turned from two pieces of 8/4 stock glued face to face.



The finished diameter of the pedestal is 5½". However, the size of the blank should start out about 6" in diameter in case the faceplate is slightly off center on the block.

Since this block is considerably smaller than the bowl block, I glued it to the plywood disk with a paper insert between the two to make it easier to remove later.

The first step is to true up the blank on the lathe in the same manner as the bowl blank was trued. (The tail stock can be brought up to the end of the block for support if needed.) After the block is trued, most of the waste can be removed from the area of the bead and cove, reducing the diameter of this area to 2½".

LAYOUT. The next step is to layout the positions of the bead and cove on the blank. First I cut a groove with the parting tool to mark the depth of the cove at its deepest point, see Fig. 10.

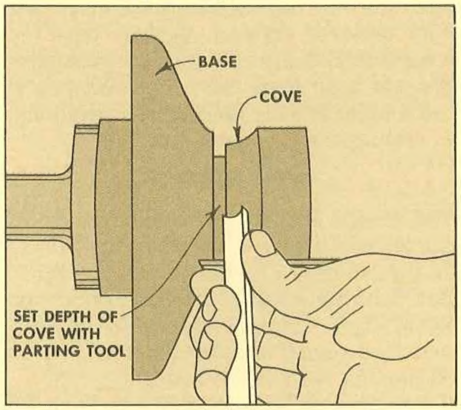
The next step is to start shaping the profile of the base using the gouge. Once the basic shape of the base is formed, the cove can be turned so that it blends in with the base and also forms a continuous curve where it meets the bead, see Fig. 10. The bead is then cut using either the small scraper, or the skew chisel.

TURNING THE TENNON. After the pedestal's profile is completed, use a parting tool to cut a round tennon to fit the hole in the bottom of the bowl, see Fig. 11. When the tennon is close to the correct size, use the hole in the bowl to check for the final fit. This way, there's little chance of the tennon being cut too small. This is also a good way to be sure that the tennon isn't too long. (If the tennon is cut so that the fit is tight, clamping the bowl to the pedestal shouldn't be needed.)

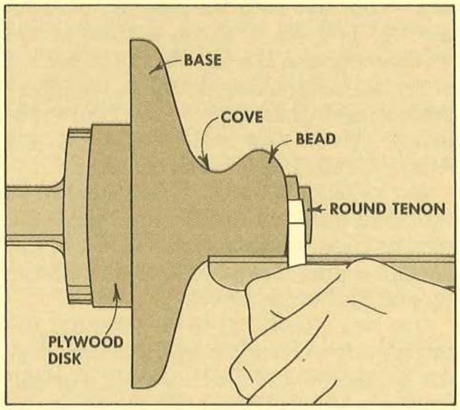
Finally, I finish sanded the entire base and then gave it a coat of *Renissance* wax. After it was buffed to a high sheen, I removed the pedestal from the lathe and separted the plywood disk from the base.

ASSEMBLY

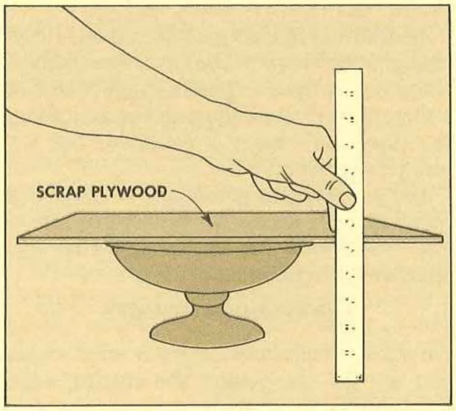
I used the method shown in Fig. 12 to assure that the bowl's rim is level when the bowl is glued to the pedestal. By placing a piece of plywood on top of the bowl and measuring the height of all four of its edges from the bench, I was able to glue the bowl perfectly level.



10 *After marking the depth of the cove with the parting tool, use the ½" gouge to shape the cove. Then blend it in with the profiles of the base and the bead.*



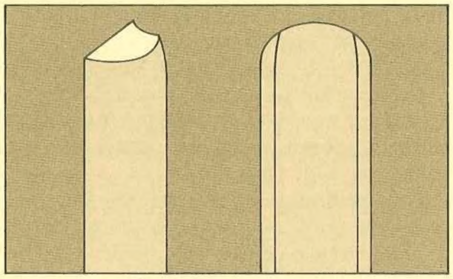
11 *The round tennon is cut with the parting tool. When the tennon is just slightly oversized, check it with the hole in the bowl to achieve an exact fit.*



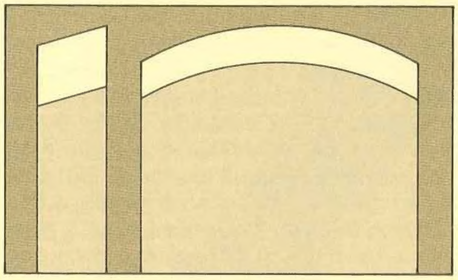
12 *To be sure that the bowl is attached to the pedestal so that it's level, lay a piece of plywood on top of the bowl, and measure the height of all four sides.*

Three Tools For Turning

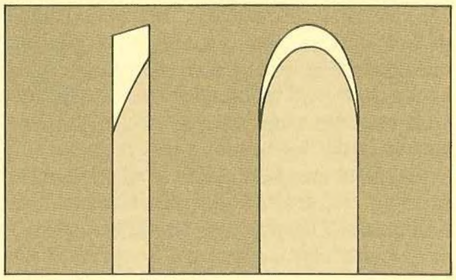
HOW TO REGRIND AND SHARPEN BOWL-TURNING TOOLS



½″ SPINDLE GOUGE



HEAVY DOMED SCRAPER



½″ LIGHT SCRAPER

Before getting to the tools used to turn the Fruit Bowl, I'd like to mention a couple of things about the lathe itself. I used a standard 36″ *Sears* lathe to turn the fruit bowl. The *Sears* lathe itself is more than adequate to do the job. However, the point I'd like to make is that a lot of the light metal benches sold for *Sears* (and other) lathes are not adequate for this kind of project.

An 11″ bowl spinning out-of-round on the lathe, creates an unbelievable amount of vibration. Unless the lathe bench is weighed down enough to dampen this effect, it will be almost impossible to turn the bowl because of the vibration.

THE GOUGE

As for the tools used: a ½″ spindle gouge did the majority of work on the fruit bowl. However, I reground the bevel of the gouge for use on faceplate turnings.

There are a couple of reasons for regrinding. First of all, the bevel on a spindle gouge is usually ground to about 30°. But if it's used for faceplate turning with the 30° bevel, the handle would hit the top of the bench as it's being used.

In order to keep the bevel rubbing on the wood and still allow clearance, I hollow-ground the bevel to about 45°.

In addition to changing the bevel, I also changed the shape of the tip. The standard shape on the tip of a spindle gouge is that of a fingernail. For turning on the faceplate, the fingernail shape is retained, but it's less pronounced.

NOTE: All of this grinding was done on a *Sears* grinder with a *Norton* 60-grit stone. See *Woodsmith* No. 20 for more on this sharpening equipment.

SHARPENING GOUGES

No matter what bevel angle or what shape you use for the gouge, the cutting edge must be sharp. I use slip stones to sharpen the gouge after it's been reground.

Slip stones have a long wedge shape with a crowned edge — an ideal shape for honing turning tools. (Some books show turning tools being honed on a bench stone, but for the life of me, I can't do it that way.)

SHOP NOTE: Because honing a gouge will hollow out the surface of any sharpening stone, I mark one side of the stone with a small notch to designate that this side is for gouges only. The side without the notch is used for only the flat tools (skews).

To obtain a truely sharp edge, I use a series of three slip stones: a medium *India*, a fine *India*, and a soft Arkansas.

HONING. After the gouge is removed from the grinder, the first step is to remove the burr on the inside of the "U".

Place the slip inside the "U" and hone the entire edge from corner to corner by sliding the crowned edge of the slip back and forth in the "U".

Always keep the majority of the slip well back in the "U" to prevent any chance of it teetering and rounding over the cutting edge. If the "U" side of the gouge becomes rounded over at the cutting edge, it will have to be reground until it's flat again.

After the burr is removed from inside of the "U", hone the bevel side of the gouge. (Honing the inside of the "U" usually just bends the burr over to the bevel edge.)

Honing the bevel edge is also done with a slip — but this time the face (flat side) of the slip is used. I sit on a stool at the workbench with the handle's butt nestled in my lap and the steel shank of the gouge pressed against the front edge of the workbench. This way the tool is stationary, yet it can be rolled as it's sharpened.

As the gouge is honed, I slide the slip in a back-and-forth motion (in line with the cutting edge) along a small section of the bevel, keeping it pressed against both the tip and heel of the bevel.

One way I've found to be sure that the cutting edge is being honed (and not just the bevel) is to see if oil is rolling over the cutting edge and down the inside of the "U". If it is, I know the stone is in contact with the very tip of the edge.

To continue honing around the cutting edge, I roll the gouge in my right hand as I hone with the slip in my left hand.

Hone the bevel until the burr is removed, then repeat the honing on the inside of the "U". When the burr is removed from both sides, use the next finer slip and repeat the process.

THE DOMED SCRAPER

The heavy domed scraper I used to clean up the surface after the gouge is made by *Sorby* of England. We purchased a complete set of *Sorby* scrapers from *Woodcraft Supply Corp.*, but I've found that the domed scraper is the only one I use enough to justify the cost.

The *Sorby* domed scraper is forged from ⅜″ thick steel. This extra-thick blade helps dampen the vibration, and when it's used with a light touch, it can really help smooth out troublesome end grain.

The bevel on any scraper is ground to a very steep angle (15° to 20°). This steep angle allows the thickness of the tool absorb some of the punishment.

When the scraper is used, it can be taken directly from the grinder to the lathe, without any honing. The burr left by the grinder is what actually does the cutting.

If the scraper produces nothing but dust, the burr has been worn off, and a new burr must be formed. Lightly pass the scraper over the grinding wheel a couple of times to form a new burr. The burr put on the scraper usually doesn't last very long, so resharpening is done quite often.

LIGHT SCRAPER

The ½″ light scrapers provided in standard starter sets are, in a nut shell, too light to do much besides forming special shapes. But for this kind of special application work, a light scraper is ideal to do the job. I reground a light scraper to form the lip on the outside wall of the bowl.

For this application, the tip of the ½″ scraper is ground to a more rounded profile than was on it originally. This really helped eliminate any chance of the corner of the scraper catching the fruit bowl's lip.

Talking Shop

AN OPEN FORUM FOR QUESTIONS AND COMMENTS

FLOATING TOPS

I keep seeing the term "floating top construction on case pieces and tables" used to describe a lot of furniture, like on Ethan Allen table tops. This terminology is also used in their catalog. I can't seem to get any satisfactory explanation from anyone on what this actually means. Can you clarify this terminology?

Bill Herbert
Wauwatosa, Wisconsin

Basically what this means is that when a solid wood table top is attached to a base, it's not glued in place. It's usually attached with some sort of system to allow the top to expand and contract during the changes in humidity from season to season. If the top were attached so that it couldn't move, it would warp and/or split as it tried to expand and contract.

There are several ways to accomplish floating top construction. Using buttons to attach the top, (as in the oak table in Woodsmith *No. 15) is one way to do this.*

Another way is to screw (no glue) the top to the base through a slotted groove. (This was done on the six-drawer chest in issue No. 17.) The groove allows the screw to move with the top as it expands and contracts.

Whatever the method, the idea is to allow the top to expand and contract while still being attached to the base. The same type of problem often pops up with raised panels. That's why the panel in a raised panel door is always inserted loosely, to allow for expansion and contraction.

CLEANING SAW BLADES — SAFELY

In *Woodsmith* No. 17, there was a letter in your Tips and Techniques section from a reader called "Cleaning Saw Blades". In the tip, he recommended using lye to clean saw blades.

I'd like to point out that the lye (NaOH) is approximately 3N (chemist jargon), which is relatively strong. If it gets into your eyes, you can expect some permanent damage even if you get immediate medical attention. The extent of the damage will be determined by the strength of the chemical and how soon it is removed.

Lye is a very dangerous material and I feel your readers should be made aware of it.

Arthur M. Coates
Weston, Massachusetts

We get an awful lot of mail suggesting the use of lye, oven cleaners, etc. to clean saw blades. Besides the obvious hazards to your health, it seems to me that over a period of time it would be kind of hazardous to your pocketbook too.

We think the safest, and the cheapest way to clean saw blades is to use a product that's designed for just that. In our shop we use two different types of resin removers.

One type is available from the Woodcraft Supply catalog. It's sold in gallons only, for $19.95. That may sound like quite a bit of money for only one gallon, but it's diluted with water before use to a ratio of 4 parts water to 1 part cleaner. Effectively making it five gallons of cleaner.

The second type is available from Sears, and the only real difference is that comes full strength, ready to use. Its available in pints and costs $9.99.

What's really nice about both of these products is that they're quick and odorless. And they're also non-toxic. As far as we're concerned, we wouldn't use anything else.

SHOP TIP: *We soak our saw blades in an old pizza pie pan that's just large enough to totally submerse a 10" wide blade.*

THE ELUSIVE CURVES

I can do up a set of plans for almost anything, yet when it comes to the layout of curves, I'm lost. I've even tried French curves, but they never seem to look like the layouts I'm working from. Can you shed any light on how to draw these curves so that they look in proper proportions?

John Hickford
Morgantown, West Virginia

Unfortunately, we don't really have any quick fixes for this problem. In fact, we go through the same thing all of the time.

When there's a pattern of a curve you want to enlarge, it's usually on a grid system. And all that's really required is to plot points on another, larger grid.

When you're drawing a curve without a pattern, it's best to start by plotting any known points of the curve. Then simply free hand a sketch of the curve as best you can.

Both of these methods should produce a rough version of the curve you want. Then it's just a matter of refining the finished version. This is where both French curves, and adjustable curves come into play. When a French curve is used, problems often arise because they don't match the entire curve. The way we use a French curve is to "clean up" the rough sketch lines by drawing only small portions of the curve at one time (as much as the French curve will follow without changing the shape of the original curve).

Sometimes adjustable curves (made of flexible rubber), can be used when a French curve won't work.

Ted (our design director) feels that it's usually not necessary to duplicate a curve exactly. If you're in the ball park, and it looks good to you, go ahead and use it. Nobody will ever know that it's not an exact duplicate unless you tell them so.

French curves and adjustable curves are available in both The Woodcraft Supply *and the* Garret Wade *catalogs. They should also be available at a local art store.*

It's really worth the time to make yourself familiar with the different items your local art store stocks. You'll be amazed at how many little gadgets they have that are ideal for woodworking.

BED RAIL FASTENERS

I'm in the process of building a set of bunk beds for my two grandsons, and I've run into a problem. I'm having trouble locating bed rail fasteners to attach the rails to the bed posts. Can you suggest any sources for bed rail fasteners?

Frank LaChapelle
Baton Rouge, Louisiana

Bed rail fasteners are available through The Woodworkers' Store, *21801 Industrial Blvd., Rogers, MN 55374-9514, (612) 428-3200.*

They offer two sizes of bed rail fasteners, both a 4" (Catalog No. 28589) and a 6" (Catalog No. 28597). Call for current pricing and shipping information.

A NITTY GRITTY FOLLOW-UP

I just received my March issue of *Woodsmith*, and in reading the article "The Nitty Gritty on Stones", I think I can help you in finding the silicon carbide slurry.

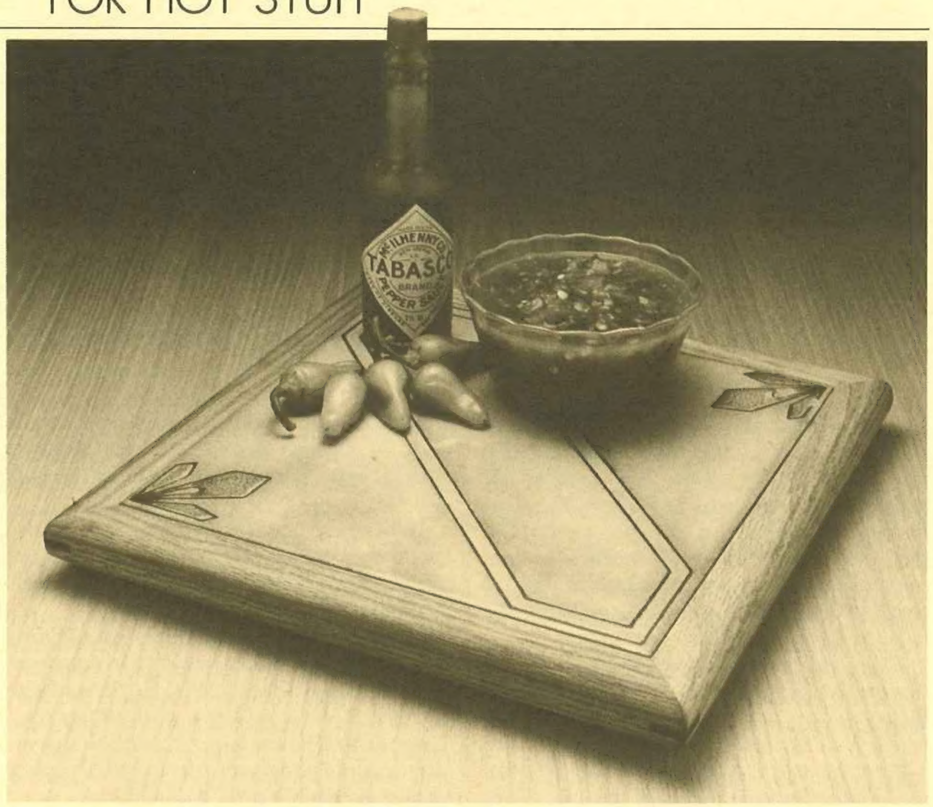
All lapidary (rock and gem) stores carry silicon carbide grit for tumbling stones. It's usually available in 90, 120, 220, and 400 grits.

Donald E. Hoskinson
Pensacola, Florida

We went to a local rock and gem store and bought some . . . it's just what we needed.

Tiled Trivet

FOR HOT STUFF



One Saturday, Ted came into the shop and was hard at work cutting wood and making sawdust. I thought, "What devotion. I should give him a raise."

When I asked what he was working on, he told me it was a trivet to match the oak table and chair set (shown in *Woodsmith* No. 15). It turned out kind of nice, so we decided to include it in this issue.

The basic procedure is to build a frame to fit around an 8" ceramic tile.

THE RABBET. The first step is to rip a strip of wood 1⅝" wide and about 40" long. Then a rabbet is cut on one edge for the tile. This rabbet should be wide enough to accept the small "pads" on the bottom of the tile, see Fig. 3. (For the tile we used, this meant a ⅞"-wide rabbet.)

The depth of the rabbet is also determined by the tile. It's nice if the tile is raised about 1/32" above the top of the wood frame. So, measure the thickness of the tile (ours was ⅜" thick) and then cut the rabbet 1/32" *less* than this measurement.

MITERS. Now the four pieces for the sides can be cut to a rough length of 10". Next, both ends of each piece are mitered (at 45°) to final length.

To determine the final length: Measure the width of the tile (which was 7⅞" in our case). Then add twice the width of the border part of the frame (this is the distance between the shoulder of the rabbet and the outside edge).

Since this border is ¾" wide, we added a total of 1½" to the width of the tile. Thus, each side was mitered to a final length of 9⅜" (7⅞" plus 1½").

SPLINE GROOVES. To join the four sides, spline grooves are cut on the mitered ends of each piece. Ted used the router table to cut the spline grooves ⅛"-wide, ¼"-deep, and centered on the thickness of the stock.

Next, the walnut splines are cut to fit the grooves. When these splines are glued into the grooves, one end should be trimmed back so it doesn't interfere with the tile, see Fig. 2.

ASSEMBLY. To assemble the frame, simply apply some glue to the miters and splines and push them together with hand pressure. It's best to insert the tile at this point so you're certain the frame is square with the tile.

After the glue is dry, sand off the exposed corners of the splines, and round over the edges with a ¼" quarter-round bit. Then drill some ¼" holes on the bottom for oak button "feet". Finally, the frame is finished with *Watco* Danish Oil.

P.S. I decided against the raise.

FIGURE 1

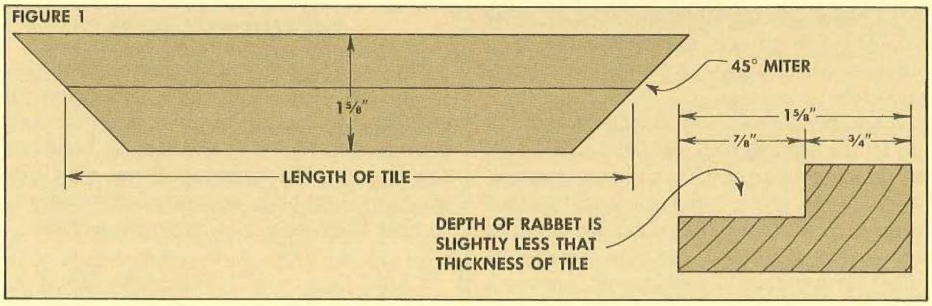


FIGURE 2

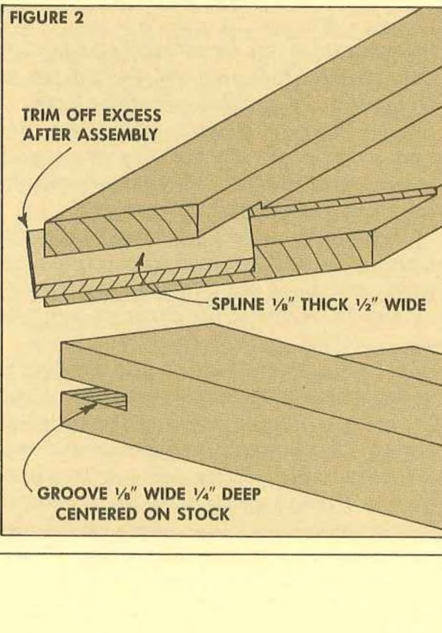


FIGURE 3

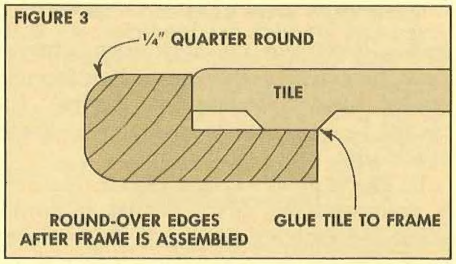


FIGURE 4